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ABSTRACT

This report discusses the objectives and outcomes of a project that investigated the use of augmentative and alternative communication (AAC) systems by students with severe communication disabilities. The first objective of the project was to conduct five investigations to identify skills that contribute to the communicative competence of students who use AAC systems. The following skills were identified: use of an introduction strategy, use of partner-focused questions, use of nonobligatory turns by AAC users with efficient rates of communication, and use of grammatically complete messages by AAC users with efficient rates of communication. The project's second objective was to conduct three investigations to evaluate the efficacy of instructional techniques to promote the acquisition, generalization, and long term maintenance of these skills. The instructional techniques resulted in the successful acquisition of target behavior, generalization of its use to practices and new situations in the natural environment, and maintenance of the target skill at least two months post-instruction. The third objective was the successful development and evaluation of three instructional modules for use by speech language pathologists, teachers, and other professionals that documented the instructional goals and techniques. The instructional modules are included in the appendices. (Contains 99 references.) (CR)

Exemplary Practices to Develop the Communicative Competence of Students Who Use Augmentative and Alternative Communication

Final Grant Report

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Exemplary Practices to Develop the Communicative Competence of Students Who Use Augmentative and Alternative Communication

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PROJECT SUMMARY

Students with severe communication disabilities are seriously restricted in their participation in home, school, and community. Without functional speech, these students are excluded from full participation in an appropriate education and are at risk for their cognitive, academic, and socio-emotional development. Augmentative and alternative communication (AAC) systems (e.g., computer-based voice output systems, communication boards, sign language) have offered these students a potential means for increased communication and participation. To date, however, this potential has not been fully realized. There are three major obstacles to achieving improved communication performance for students who require AAC: lack of understanding of the skills that contribute to communicative competence for students using AAC; lack of knowledge of instructional techniques that are effective in developing these skills; and lack of effective instructional resource materials for professionals who work with students who use AAC. The AAC Communicative Competence project had three distinct objectives to address these obstacles: (a) to conduct 5 investigations to identify skills that contribute to the communicative competence of students who use AAC systems; (b) to conduct 3 investigations to evaluate the efficacy of instructional techniques to promote the acquisition, generalization, and long term maintenance of these skills; and (c) to develop and evaluate 3 instructional modules for use by speech language pathologists, teachers, and other professionals, documenting the instructional goals and techniques.

Under Objective #1, 5 investigations were conducted to analyze the effects of specific linguistic, operational, social, and strategic behaviors on the communicative competence of persons using AAC as perceived by three groups of observers, professionals with experience in the AAC field; adults with no prior experience in AAC; and adolescents with no prior experience in AAC. The five skills investigated were: (a) use of an introduction strategy with new partners (i.e., a message providing information on the means of communication used by the individual and on strategies for the partner to facilitate communication); (b) use of partner-focused questions (i.e., questions about the partner and his/her experiences); (c) use of nonobligatory turns (i.e., turns that follow a partner's comment or statement); (d) use of grammatically complete messages versus telegraphic messages (i.e., use of syntactically correct messages that include both content words and functors versus use of telegraphic messages that only include the main content words); and (e) use of nonverbal feedback (i.e., eye contact, facial expression, and head nods to

communicate interest and involvement). Three separate studies were conducted under each investigation, following the same methodology; each study considered the impact of the target skill from the perspective of a different group of observers (or potential communication partners): professionals with experience in the AAC field; adults with no prior experience in AAC; and adolescents with no prior experience in AAC. The observers in each group participated in two data collection sessions, separated by a one week interval. In each session, they viewed videotaped interactions of two students, with severe speech and physical impairments, using AAC systems to interact with a variety of nondisabled partners in various social situations. The videotapes viewed in the two sessions differed only with respect to the specific behavior manipulated as the independent variable in each investigation (i.e., use of an introduction strategy when meeting new partners [Investigation #1]; use of partner-focused questions [Investigation #2]; use of nonobligatory turns [Investigation #3]; use of grammatically complete versus telegraphic messages [Investigation #4]; and, high frequency of nonverbal feedback versus low frequency [Investigation #5]). The order of viewing the experimental conditions was counterbalanced across the observers to control for order effects. The observers were asked to complete a scale rating the communicative competence of each of the two students using AAC. Separate ANOVAs were conducted for each study to compare observer ratings in order to determine the effect of the specific linguistic, operational, social, or strategic behavior on the perceived communicative competence of the two students using AAC. Observers also completed a forced choice question, indicating in which videotape the AAC user was a more competent communicator or if there was no difference between the two videos.

The results of Investigation #1 indicated that use of an introductory strategy positively impacted the communicative competence of both of the AAC users as perceived by the professionals with experience in AAC, by the adults with no prior experience in AAC, and by the adolescents with no prior experience in AAC. The results of Investigation #2 indicated that use of partner-focused questions positively impacted the communicative competence of both of the AAC users as perceived by the professionals with experience in AAC; results for the adults with no prior experience in AAC were equivocal, but suggested that partner-focused questions positively impacted their perceptions of communicative competence also. However, the use of partner-focused questions had no effect on the communicative competence of the AAC users as perceived by the adolescents with no prior experience in AAC. Developmental factors may account for the differences in the results; adolescents may not yet have reached a stage of development where they expect or value 'other orientation'. The results of Investigation #3 indicated that, according to both groups of adults, the use of nonobligatory turns increased ratings of communicative competence, but only for the male AAC user who had a faster rate of communication; ratings of

the communicative competence of the female AAC user (who had a slower rate of communication) were not affected by the use of nonobligatory turns. Results of Investigation #4 suggested that the use of grammatically complete messages increased the communicative competence of the male AAC user who had a faster rate of communication for all three groups of observers. The use of grammatically complete messages did not affect the communicative competence of the female AAC user who communicated at a slower rate, according to the professionals with experience in AAC and the adolescents with no prior experience in AAC; results for the female AAC user were equivocal for the adults with no prior experience in AAC, but suggested that the adults without prior experience in AAC may value grammatical completeness even if the rate of communication is slower. The results of Investigation #5 indicated that the use of nonverbal feedback did not positively affect the communicative competence of the AAC users, according to the adolescents with no prior experience in AAC. Results from both groups of adults were equivocal, but suggested that nonverbal feedback may positively contribute to the communicative competence of AAC users. Future research using different methodologies is required to further investigate this issue. In summary, the investigations under Objective #1 identified the following skills that seem to contribute to the communicative competence of AAC users: use of an introduction strategy; use of partner-focused questions; use of nonobligatory turns by AAC users with efficient rates of communication; and use of grammatically complete messages by AAC users with efficient rates of communication.

Under Objective #2, 3 investigations were conducted, each focused on the acquisition of one of the following behaviors identified as contributing to communicative competence: use of an introduction strategy (Investigation #6); use of partner-focused questions (Investigation #7); and use of nonobligatory turns by AAC users with efficient rates of communication (Investigation #8). Each of the 3 investigations employed a single subject multiple probe experimental design, replicated across 5-6 subjects, to investigate the effect of instruction on the acquisition, generalization, and long term maintenance of the target behavior. Subjects in each of the studies had severe speech impairments and used AAC. In order to increase the generality of results, subjects represented various disabilities and ages in each of the studies. Instruction incorporated "best practices" as documented in the literature in Special Education and in AAC; a "least to most" prompting hierarchy was used. Results of each investigation were socially validated to ensure that the instruction improved the communicative competence of the subjects and that its outcomes were valued by the subjects, by their significant others, and by society generally. In each of the 3 investigations, the instructional program resulted in the subjects successfully acquiring the target behavior, generalizing its use to practiced and new situations in the natural environment, and maintaining use of the target skill at least two months post-instruction. In

Investigation #6, it took an average of seven 30-40 minute instructional sessions (range 3-13 sessions) for the subjects to learn to use an introduction strategy spontaneously and to generalize its use to new situations in the natural environment. In Investigation #7, the subjects took an average of twelve 30-40 minute instructional sessions (range 4-29 sessions) to learn to ask partner-focused questions spontaneously in the natural environment. In Investigation #8, it took the subjects an average of nine 20-30 minute instructional sessions (range of 7-10 sessions) to learn to take nonobligatory turns spontaneously in naturally occurring interactions. One of the subjects in Investigation #8 did not initially generalize the new skill to use with new partners; he required additional instruction to support his generalized use of nonobligatory turns with new partners in his daily environment. In all three investigations, the subjects reported high levels of satisfaction with the instructional program, as did the significant others. As a further measure of social validation, adults without prior experience in AAC viewed randomly selected videotapes of the subjects from pre and post instruction; these observers indicated that the majority of the AAC users in each of the studies were more competent communicators post instruction.

Under Objective #3, three short instructional modules were developed to serve as "how to" guides for practicing and preservice professionals. These modules documented instructional goals and procedures to teach the specific skills to further the communicative competence of individuals who use AAC that were targeted in Objective #2. Each of the modules was implemented and evaluated by 15 speech language pathologists, teachers, or preservice professionals with individuals who used AAC. Evaluation results indicated that the instructors were able to implement the instructional program documented in the modules with a high level of fidelity. Implementation of the instructional procedures during field testing resulted in the successful acquisition, generalization, and maintenance of the target skills by the individuals who used AAC, attesting to the effectiveness of the modules. All of the field testers rated the modules very positively (mean rating of 6.4 on a 7 point Likert type scale with 1=least positive rating and 7=most positive rating). All field testers indicated that they would use the modules again and that they would recommend their use to others.

The AAC Communicative Competence Project improved the understanding and remediation of the communication disabilities experienced by students using AAC by identifying empirically-validated instructional goals and techniques to develop communicative competence and by documenting this information in readily accessible, easy to use instructional modules. In general terms, the new empirically-based knowledge will result in improved communicative competence for students who use AAC. With improved communication skills, these students will be better able to participate in learning activities and educational evaluations. They will achieve greater access to vocational options and will attain fuller participation in mainstream society.

Exemplary Practices to Develop the Communicative Competence of Students Who Use Augmentative and Alternative Communication

There is a significant need to identify skills that contribute to the communicative competence of people who use augmentative and alternative communication (AAC) systems, and to investigate the practices that best support the development of these skills by children and youth who use AAC (National Institute on Disability and Rehabilitation Research (NIDRR) Consensus Validation Conference on AAC Intervention, 1992). There are an estimated one and a half million persons in the United States who have severe communication disabilities that preclude them from functional speech (American Speech Language Hearing Association, 1981). Research suggests that approximately 0.2-0.6% of the total school-aged population have such severe communication disabilities that their speech is inadequate to meet their daily communication needs (Aiello, 1980; Matas, Mathy-Laikko, Beukelman, & Tegresley, 1985). Individuals with severe communication impairments include: people who have congenital disabilities such as cerebral palsy, mental retardation, or autism; people with acquired disabilities such as those resulting from traumatic brain injury or stroke; and individuals with progressive neurological disorders such as muscular dystrophy or dystonia musculorum deformans. Congress has identified these children, those with the most severe handicaps, as service priorities for the educational system (P.L. 94-142 Sec. 612(3) and Sec. 121a. 320-324).

Without access to functional channels of communication, these individuals are excluded from full participation in appropriate educational programs, from access to vocational opportunities, and from involvement in mainstream society. P.L. 94-142 recognizes the right to an appropriate education for all children with disabilities. Yet students with severe communication disabilities are seriously restricted in their access to appropriate educational opportunities. Teaching and learning can only be realized through communication (NIDRR Consensus Validation Conference on AAC Intervention, 1992). Students must be able to communicate effectively in order to participate successfully in educational programs (Cumley & Beukelman, 1992). Students with severe communication disabilities confront obstacles that seriously restrict their participation in learning activities and educational evaluations. As a result, they are at risk for misclassification and for exclusion from an appropriate educational program. Without a meaningful education, they are severely restricted in future independent living and vocational options.

The development of augmentative and alternative communication (AAC) systems (e.g., gestures; sign language; communication boards of pictures, words, or the alphabet; and computer-based communication systems with voice output) has offered a potential means for enhanced

communication and fuller participation for students with severe communication disabilities. To date, however, the potential for communicative competence and full participation has not been realized fully (Kraat, 1985; Calculator, 1988; Light, 1988). The research indicates that children who use AAC have significant difficulty initiating interactions with speaking partners, maintaining these interactions, and contributing in a meaningful way (Kraat, 1984). Speaking individuals tend to control interactions by taking more turns, initiating most of the topics of conversation, and asking repeated yes/no questions that restrict the children's communication options (Calculator & Dollaghan, 1982; Culp, 1982; Harris, 1982; Light, Collier, & Parnes, 1985a, 1985b). Children who use AAC tend to occupy a respondent role in their interactions with others: they forfeit many of their turns in the interactions, seldom initiate, and respond only when obliged to do so, and then with minimal responses (Calculator & Dollaghan, 1982; Culp, 1982; Harris, 1982; Light, et al., 1985a, 1985b). Relegation to the role of "responder" limits students in their ability to communicate their preferences, make choices, ask questions, request clarification, and be spontaneous (Dattilo & Light, 1992). Students with severe communication disabilities are often "pre-empted" from opportunities to communicate by teachers and parents who anticipate their needs and wants (Halle, Baer, & Spradlin, 1981). Being pre-empted from opportunities to communicate may result in learned helplessness and learned dependency (Basil, 1992; Sweeney, 1991), and poses significant barriers to educational and later vocational achievement. Personal, academic, and social expectations may be reduced as a result of limited opportunities to participate at school (Jones, Beukelman, & Hiatt, 1992).

The importance of communication skills to full participation in an appropriate educational program has been recognized by teachers, parents, and researchers. In a recent survey of parents and teachers of students using AAC in Pennsylvania and Ontario, Canada, 100% of the teachers and 80% of the parents indicated that learning to communicate effectively was the top priority for these students (Light & McNaughton, 1993). As Beukelman (1992) noted, "...the primary goal for AAC users in school is to become and to remain continuously communicatively competent" (p. 84).

There are two major obstacles confronted in attempts to develop the communicative competence of children who use AAC: (a) lack of understanding of the skills that contribute to communicative competence for individuals who use AAC; and (b) lack of knowledge of the practices that are effective in promoting these underlying skills. These problems are further aggravated by the lack of appropriate instructional materials available for speech language pathologists, educators, and related professionals. In a survey of teachers working with students

using AAC in Pennsylvania and Ontario, Canada, 80% of the teachers identified the need for appropriate instructional materials as a top priority (Light & McNaughton, 1993). The AAC Communicative Competence Project addressed the documented concerns of parents and teachers to develop the communicative competence of students using AAC.

LITERATURE REVIEW

Historically, AAC interventions with children and youth were premised on models taken from "normal" spoken communication. More recently, practitioners and researchers have realized that there are fundamental differences in the communication process via an AAC system; these differences render the assumptions of models of normal spoken communication inadequate and invalid when they are applied to communication processes involving AAC (Beukelman, 1988; Kraat, 1985; Light, 1989). For example, the rate of communication via natural speech is approximately 125-175 words per minute; communication rates via aided AAC systems typically fall below 15 words per minute, less than 10% the rate of natural speech (Foulds, 1987). Children using natural speech to communicate typically have access to thousands of words to express their ideas; preliterate children using AAC must typically communicate using a limited vocabulary set of pictures or symbols. Numerous researchers, educators, and clinicians have recognized the many inherent differences between communication via natural speech and communication via AAC (Beukelman, 1988; Buzolich & Higginbotham, 1985; Kraat, 1985; Light, 1988). They have argued that there is an urgent need to develop a better understanding of the skills that contribute to effective communication for someone using AAC systems, taking into account the unique adaptive strategies that may be required.

In 1989, Light proposed an initial definition of communicative competence for persons using AAC. She argued that the development of communicative competence is a complex process that rests on knowledge, judgment, and skills in four domains: **linguistic**, **operational**, **social**, and **strategic**. The former two domains (linguistic and operational) reflect knowledge and skills in the tools of communication; the latter two domains (social and strategic) reflect functional knowledge, judgment, and skills in interactions. Light (1989) argued that attainment of communicative competence is dependent on mastery and integration of skills in each of the four domains.

Within the **linguistic** domain, Light (1989) argued that in order to achieve communicative competence, children using AAC face two challenges: they must master the native language(s) as spoken by their home and broader social community (i.e., receptive and expressive skills in the form, content, and use of the native language); and they must master the "linguistic" code of their AAC systems (i.e., the referential meaning of the symbols used [e.g., Blissymbols, Picture Communication Symbols, Picsyms, signs, traditional orthography], and the syntactic or structural aspects of message formulation via these symbols).

Light (1989) argued that mastery of linguistic skills is necessary, but not sufficient, to ensure access to communication. Children must also develop **operational** skills, that is, the technical skills to operate their AAC systems. Operational skills include: the skills to produce the correct hand shape, orientation, and movement to produce signs or gestures; the skills to operate features of a computer-based AAC system (e.g., the on/off switch, volume control); and the skills to use an access method to select items from an AAC system (e.g., scanning via a single switch, use of a head pointer or chin pointer, use of a light pointer or optical pointer). Operational skills will determine, at least in part, the accuracy and speed of communication for the student who uses AAC.

Linguistic skills and operational skills provide students using AAC with access to the tools to allow communication. However, as Kraat (1984) noted, the mere provision of the tools of communication does not ensure their effective use in daily interactions. Therefore, Light (1989) argued that communicative competence also rests on the development of knowledge, judgment and skills in the **social** rules of communication, including both the sociolinguistic aspects and the sociorelational aspects. Sociolinguistic skills refer to the rules governing daily interactions including, for example, discourse strategies such as initiating, maintaining, and terminating interactions, and communicative functions such as requesting assistance, providing clarification, and requesting information. Sociorelational skills refer to the interpersonal dynamics of interactions and include, for example, the desire to communicate, interest in others, active participation in conversations, responsiveness to partners, and ability to put partners at ease. To date, the sociorelational aspects of interactions have largely been neglected in the AAC field, and yet skills in this area are critical to an individual's effectiveness in daily interactions. As Warrick (1988) argued, many individuals who use AAC may be more challenged by social/relational issues than by limitations of physical and cognitive functioning.

Despite the development of linguistic, operational, and social skills, children and youth who use AAC may still confront limitations in their daily interactions. Given the severe

communication disabilities experienced by many children who require AAC, Yoder and Kraat (1983) argued that these children will inevitably find themselves in situations where they "cannot say what they want to, when they want, and how they want to" (p. 32). In these instances, Light (1989) argued that children need **strategic** skills - skills that allow them to make the best of what they do know and can do. Savignon (1983) emphasized the importance of strategic skills in the area of second language learning: "the effective use of coping strategies is important for communicative competence in all contexts and distinguishes highly competent communicators from those who are less so" (p.43). Although several authors have highlighted the importance of adaptive strategies for people using AAC (e.g., Dowden & Beukelman, 1988; Kraat, 1986; Vanderheiden & Lloyd, 1986), to date there has not been a systematic attempt to document the range of compensatory strategies used by successful AAC users to circumvent linguistic, operational, and social restrictions and to promote communicative competence.

While the model of communicative competence for persons using AAC, proposed by Light (1989) has been frequently referenced in the field (e.g., Bedrosian, Hoag, Calculator, & Molineux, 1992; Beukelman & Mirenda, 1992; Kangas, 1991), to date there has been a paucity of research to operationalize this model and to better specify the skills that contribute to the attainment of communicative competence by students who use AAC. Three studies have addressed these issues to date.

Buzolich (1984) investigated the communicative competence of two adults using AAC. Each of these adults was videotaped interacting with a partner in two different conditions: using an alphabet board and using a computer-based AAC system (the Handi-Voice 120). Ratings of communicative competence were obtained from the participants themselves and from observers with no prior experience in AAC. For the observers with no prior experience in AAC, ratings of communicative competence seemed to be related to "the system of communication used, the communicative ability of the user, communicative partner, and the interaction of these variables" (Buzolich, 1984; p. 2). Overall, it seemed that rate of communication was an important variable, with the faster interactions judged more positively than the slower ones. Unfortunately, rate was not systematically controlled in the study by Buzolich (1984), rendering any conclusions regarding its impact speculative at best. Furthermore, the study failed to counterbalance the order of presentation of the videotapes to the naive raters, so that results may have been confounded by order effects.

Kangas (1991) also conducted a preliminary investigation to explore the relationship between the rate of communication achieved by youth using computer-based AAC systems and

the perceived communicative competence of the users. Communication rate was measured from videotapes of 19 students using AAC in interactions with a familiar school staff person. Perceived communicative competence was measured through rating scales completed by special education personnel familiar with each of the students. Correlations between rate and perceived communicative competence were not statistically significant, although Kangas reported a trend in the data suggesting that slower rates of communication were associated with more positive ratings of communicative competence, a trend in the opposite direction than expected. Unfortunately, the study by Kangas failed to control for confounding variables: slower rates of communication may have been associated with greater linguistic complexity, a factor that may impact positively on perceived communicative competence (cf. Bedrosian, et al., 1992; Hoag & Bedrosian, 1992). The design employed by Kangas did not allow for the identification of a causal relationship between user skills and perceived communicative competence. Furthermore, the validity of the measures of communicative competence used by Kangas (1991) was not established.

Bedrosian, et al. (1992) conducted a preliminary investigation to study the effects of the linguistic complexity of messages produced by the user of AAC and the effects of partner re-auditorization (i.e., expanded repetitions of the AAC user's message by the partner) on listeners' perceptions of the communicative competence of the AAC user. Two groups of subjects (nondisabled adults with no prior experience in AAC and speech language pathologists with experience in AAC) viewed videotapes of an "AAC user" (played by a nondisabled actor) and a nondisabled partner conversing in four different conditions. These conditions represented two levels of linguistic complexity (i.e., single words or short phrases of two to four lexical items) and two levels of re-auditorization (i.e., with or without re-auditorization). Following the viewing, the subjects completed a questionnaire designed to assess the communicative competence of the AAC user. Hoag and Bedrosian (1992) conducted a follow up study using a similar methodology and investigated the effects of message length, re-auditorization, and speech output type (synthesized or digitized) on the perceived communicative competence of an "AAC user". Results of these two studies indicated that re-auditorization by the partner and speech output type had no effect on listeners' perceptions of the communicative competence of the AAC user. However, increased linguistic complexity had a positive impact on listeners' perceptions of the user's communicative competence, especially when the listeners were speech language pathologists. Unfortunately, the reliability and validity of the measures used by Bedrosian, Hoag, and their colleagues was not clearly established.

In summary, the research to date to investigate the skills that contribute to communicative competence is very limited. Only one skill in the linguistic domain (i.e., linguistic complexity) and one skill in the operational domain (i.e., rate of communication) have been investigated. The impact of other linguistic, operational, social, and strategic skills has not been studied. Valid and reliable measures of communicative competence have not been established.

PROBLEM STATEMENT

There is, therefore, an urgent need for research to investigate factors that contribute to the communicative competence of children and youth using AAC. The results of this line of research will provide information to teachers, speech language pathologists, parents, and other educational support personnel on what skill areas to target for instruction in order to foster the communicative competence of students using AAC. As Bedrosian et al. (1992) argued: "No longer can we select communicative target behaviors for both the AAC user and partner from a magician's hat without considering the effects of these behaviors on perceptions of the AAC user's communicative competence" (p. 39-40).

However, simply identifying the skills that contribute to communicative competence for AAC users and targeting these skills as goals for intervention will not ensure that these goals are successfully realized. Instructional techniques to foster the development of these skills must be identified and evaluated to ensure their efficacy in contributing to the communicative competence of students who use AAC. There is an urgent need for a line of research to identify "best practices" that promote the attainment of skills furthering the communicative competence of AAC users (Calculator & Jorgensen, 1991). Documentation of the exemplary practices identified through this line of research in easy to use, instructional guides will provide speech language pathologists, teachers, and related professionals with information on how to conduct instruction with students using AAC to promote their communicative competence. Such research will further the understanding of the unique challenges faced by children and youth using AAC and will improve practices of remediation and compensation with this population. Through the development of communicative competence, students using AAC will attain fuller participation in appropriate educational programs and greater access to vocational options.

Given the needs identified, the Communicative Competence Project initiated a line of research designed to systematically investigate the attainment of communicative competence by

students using AAC, and to document this information for professionals, consumers, families, researchers, and administrators. The Communicative Competence Project had three distinct objectives:

1. To conduct and report on 5 investigations to identify skills that contribute to the perceived communicative competence of students using AAC;
2. To conduct and report on 3 investigations to evaluate the efficacy of instructional techniques to promote the acquisition, generalization, and maintenance of the skills identified through Objective #1 as contributing to communicative competence; and
3. To develop and evaluate 3 instructional modules for use by speech language pathologists, teachers, and other professionals describing the exemplary practices (identified through the investigations of Objective #2) for fostering the communicative competence of students using AAC.

OBJECTIVE #1

To conduct and report on 5 investigations to identify skills that contribute to the communicative competence of students using AAC.

Objective #1 addressed the first of the problems described in the literature review: lack of understanding of the skills that contribute to the communicative competence of students who use AAC and, therefore, lack of knowledge of what are appropriate instructional goals for these students. Five investigations were conducted to analyze the effects of specific independent variables (i.e., specific linguistic, operational, social, and strategic behaviors) on the communicative competence of students using AAC as perceived by three groups of observers - professionals with experience in the AAC field, adults with no prior experience in AAC, and adolescents with no prior experience in AAC.

Each of the five investigations conformed to the same methodology, with the exception that each investigated the effects of a different independent variable. Investigation #1 explored the effect of an introduction strategy with new partners (i.e., a message providing information on the means of communication used by the individual and on strategies for the partner to facilitate communication); Investigation #2 investigated the effect of partner-focused questions (i.e., questions about the partner and his/her experiences); Investigation #3 the effect of nonobligatory turns (i.e., turns that follow a partner's comment or statement); Investigation #4 the effect of

grammatically complete versus telegraphic messages (i.e., use of syntactically correct messages that include both content words and functors versus use of telegraphic messages that only include the main content words); and, Investigation #5 the effect of nonverbal feedback (i.e., eye contact, facial expression, and head nods to communicate interest and involvement).

The following section provides a description of the general methodology employed for all five investigations. The description of the general methodology is followed by specific descriptions of each of the five investigations, including definition of the specific independent variables investigated, description of the subjects, presentation of results, and discussion of the implications of these results.

General Methodology for Investigations Under Objective #1

Research Questions

The following research questions were addressed by each of the 5 investigations under Objective #1 in this project:

1. What is the effect of the target skill (i.e., the specific linguistic, operational, social, or strategic skill under investigation) on the communicative competence of individuals who use AAC as perceived by professionals with experience in AAC?
2. What is the effect of the target skill on the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC?
3. What is the effect of the target skill on the communicative competence of individuals who use AAC as perceived by adolescents with no prior experience in AAC?

Each of the 5 investigations manipulated one specific linguistic, operational, social, or strategic behavior as the independent variable: use of an introduction strategy [Investigation #1], use of partner-focused questions [Investigation #2], use of nonobligatory turns [Investigation #3], grammatical completeness [Investigation #4], and nonverbal feedback [Investigation #5] . The independent variables were determined as follows. A comprehensive literature review was completed to identify skills that may contribute to the communicative competence of persons who use AAC. From this literature review, an extensive list of skills was generated that might potentially contribute to the communicative competence of people using AAC (see Appendix A). This comprehensive list was reviewed by project staff and by an Advisory Panel of leading professionals and consumers in the AAC field. Twelve skills were identified as priorities to investigate based on the following criteria: (a) skills that were most likely to contribute to the

communicative competence of AAC users; (b) skills that were viable goals to teach to someone who uses AAC; (c) skills that could be operationalized; (d) skills that had a clear rationale to support their investigation; and, (e) skills that had not been investigated to date. The list of 12 priority skills was again reviewed by project staff and by the Advisory Panel. Data were collated from each of these sources and analyzed. The 5 skills selected most frequently by the Advisory Panel and project staff were then selected as the independent variables for the 5 investigations conducted under Objective #1 in this project. It should be noted that these five skills should not be considered the only skills that contribute to the communicative competence of AAC users. Other linguistic, operational, social, and strategic skills may also be important; the impact of other skills should be investigated in future research.

Design

Under each of the 5 investigations, three separate studies were conducted following the same methods. Each of the studies considered the impact of the target skill on the communicative competence of AAC users as perceived by a different group of observers: professionals with experience in AAC, adults with no prior experience in AAC, and adolescents with no prior experience in AAC. The perceptions of the three groups were investigated under separate studies since there was reason to believe that the groups would view the communicative competence of AAC users from very different perspectives and would use very different standards of measurement, given the differences in their experiences with AAC and the differences in their general life experiences and maturation. In each of the studies, the observers viewed two sets of videotaped interactions for each of two different AAC users. The videotapes depicted the AAC users in various interactions with natural speakers. The two sets of videotaped interactions for each AAC user differed on one factor only, representing the manipulation of the target behavior serving as the independent variable in the investigation. Observers were asked to rate the communicative competence of the individuals using AAC, following each videotape viewing.

The 15 studies (3 studies for each of the 5 investigations) conducted under Objective #1 of the project each employed a factorial design with two within-subjects factors: the linguistic, operational, social, or strategic behavior manipulated as an independent variable in the study; and the AAC user observed (one of two AAC users for each study). The dependent variable was the observers' ratings of the communicative competence of the individuals using AAC.

Subjects

For each of the 3 studies under each of the 5 investigations, a different group of subjects was invited to participate: professionals with experience in AAC (n=20); adults who had no prior experience or training in AAC (n=30); and adolescents who had no prior experience or training in AAC (n=30). It is important to consider the judgments of all three of these groups in determining skills that contribute to communicative competence for individuals using AAC, since all three of these groups serve to define, at least in part, the educational, vocational, and social experiences of students who use AAC. The research suggests that perceptions of the communicative competence of AAC users may vary across these different groups (Bedrosian, et al., 1992). Understanding the perceptions of professionals in the AAC field is critical because it is these individuals who identify goals for intervention and who implement instructional programs for students who use AAC. However, understanding the perceptions of adults and adolescents with no prior experience in AAC is also essential, since these groups define the social community in which the AAC user ultimately participates; they are potential communication partners of AAC users in educational, vocational, and community environments. Understanding the perceptions of AAC users themselves and of family members is also of paramount importance. Unfortunately, investigations of the perceptions of these latter groups were beyond the scope of this project; these perceptions should be investigated in future research.

For the five studies that investigated the impact of the target skills on the perceptions of professionals with experience in AAC, subjects were recruited from the membership list of the Pennsylvania Society for Augmentative and Alternative Communication and from the mailing list of the Pennsylvania Assistive Technology Center (PA ATC), a program of the PA Bureau of Special Education and a nationally recognized center of excellence in the field of augmentative communication. Subjects were also recruited from a list of professionals identified by the Assistive Technology Statewide Support Initiative Specialists across the state; these specialists are designated by each Intermediate Unit (IU) in Pennsylvania to provide consultation and support services to students requiring AAC in their IU and to the professionals working with these students on a daily basis. All potential subjects were asked to complete an information form to determine their eligibility for participation. Subject selection criteria for the professionals with experience in AAC were as follows: (a) had at least one year of professional experience working with people using AAC; (b) had experience working with at least 5 different individuals who used AAC; (c) was between 20 and 65 years of age; and (d) had no known hearing or visual impairments. The groups of professionals who participated in the five investigations were female

dominated, since the professions who work with individuals who use AAC (e.g., educators, speech language pathologists, occupational therapists) tend to be female dominated. Twenty professionals were recruited for each of the studies of experienced professionals (compared to 30 adults and 30 adolescents without experience in AAC) due to the reduced number of potential subjects in this observer group. Pilot testing prior to the five studies suggested that twenty subjects would allow sufficient power to identify the effect of specific skills.

For the studies to investigate the impact of the target skills on the perceptions of adults with no prior experience in AAC, subjects were recruited from businesses, educational institutions, churches, and service clubs in Pennsylvania. All potential subjects were asked to complete an information form to determine their eligibility for participation. Subject selection criteria were as follows: (a) had no prior education or training in AAC; (b) had no prior experience interacting with people using AAC; (c) were between 18 and 75 years of age; (d) had no known hearing or visual impairments. Care was taken to ensure that the sample for each study included both genders, and a range of ages, racial and ethnic backgrounds, educational backgrounds, and job experiences, since these variables have been known to influence attitudes and judgments (e.g., Ryan, 1981; Yuker, 1986; Yuker & Block, 1986). The groups reflected generally the demographics of adults in the state.

For the studies to investigate the impact of the target skills on the perceptions of adolescents with no prior experience in AAC, subjects were recruited from local schools and recreational programs in Pennsylvania. Potential subjects were asked to complete a basic demographic form to determine their eligibility. Subject selection criteria were as follows: (a) had no prior education or training in AAC; (b) had no prior experience interacting with people using AAC; (c) were between 11 and 18 years of age; (d) had no known hearing or visual impairments; and, (e) had parental consent to participate.

Materials

The five investigations each used 5 videotapes: a standard videotape, two experimental videotapes of a female AAC user, and two experimental videotapes of a male AAC user. The same standard videotape was shown in all five investigations. It depicted five different students with severe speech impairments who used a variety of AAC systems (e.g., communication books, computer-based voice output systems) to interact with various partners. The five students represented varied levels of communicative competence, ranging from "not very competent" to "very competent". This videotape was shown to the observers at the start of the data collection

sessions to provide an overview of AAC and to provide a basis of comparison for judgements of the communicative competence of the male and female AAC users in the experimental videotapes.

Two experimental videotapes were also made for each of the two AAC users for each of the five investigations. The two videotapes were identical for each of the AAC users, except for the manipulation of the specific behavior under investigation. For example, in Investigation #1, one of the videotapes for each of the AAC users showed him/her using an introduction strategy when the AAC user met someone new (i.e., the 'with skill' condition), while the other experimental videotape depicted the AAC user not using an introduction strategy (i.e., the 'without skill' condition). In all other respects, the two videotapes for each AAC user were similar to control for confounding variables that might influence judgements of communicative competence. The experimental videotapes were loosely scripted interactions based on real life experiences of AAC users. The experimental videotapes depicted the female and male AAC users interacting with a variety of partners (e.g., adults and peers, familiar and unfamiliar) in various contexts (e.g., school, home, community) to fulfill various communicative functions (e.g., to fulfill needs and wants, exchange information, or establish social closeness). In order to ensure the ecological validity of the videotapes, transcripts of interactions involving students who use AAC and natural speakers in home, school, and community environments were collected and reviewed to identify appropriate content for the videotaped interactions.

In the five investigations, the subjects observed video taped interactions of AAC users; they did not interact directly with the AAC users themselves. The use of videotaped interactions allowed the control of variables (e.g., variations in the topic of conversation, length of interaction, number of communicative turns) that would occur across live interactions and that would potentially confound the results. Findings from a study by O'Keefe (1991) suggested that there were no differences in the attitudes of persons toward AAC users based on whether they actually interacted with the AAC user, observed an interaction between an AAC user and a natural speaker live, or observed the same interaction on video tape.

The AAC users in the videotapes were selected from a list of eligible students nominated by the Pennsylvania Assistive Technology Center (PA ATC). Nomination criteria for the students were as follows: (a) had severe speech impairments, according to the definition of the American Speech Language Hearing Association (1981), that is, their speech was inadequate to meet daily communication needs; (b) had severe congenital physical impairments; (c) had cognitive functioning within normal limits; (d) used a computer-based voice output system and demonstrated competence in the use of the system; (e) was between the ages of 12 and 22; (f) had

hearing and vision within normal limits (with correction if necessary); (g) was able to follow a script; (h) was able to manipulate the target linguistic, operational, social, or strategic behavior under investigation; and, (i) had consent from parents or guardians to participate in the videotapes. Based on nominations from the PA ATC, 8 students were identified as potential participants in the project. These students were rank ordered based on expert judgements of their communicative competence and the top three students were contacted and invited to participate. All three students agreed to participate in the project.

The same female (H) participated in all 5 of the investigations; different videotapes were made for each of the investigations. H was 12 years old when the videotapes for the investigations into the effects of grammatical completeness and nonverbal feedback were completed; she was 13 years old when the videotapes for the other three studies were completed. A 22 year old male (B) participated in Investigation #1 (use of an introduction strategy), #2 (use of partner-focused questions), and #3 (use of nonobligatory turns). A 13 year old male (D) participated in Investigation #4 (grammatical completeness) and #5 (nonverbal feedback). All three of these individuals had cerebral palsy. They all used computer-based voice output communication systems as their primary means of communication, the Liberator with Words Strategy software. H controlled her Liberator through directed scanning via a joystick operated by her right foot. B accessed the Liberator via direct selection with a head stick. D accessed the Liberator via direct selection with his right index finger. H's rate of communication was slow; B and D were faster communicators.

Previous studies to investigate skills that contribute to the communicative competence of people using AAC (e.g., Bedrosian, et al., 1992) have used nondisabled actors to play the role of the AAC user. The present investigations used individuals with severe disabilities who use AAC to fulfill this role, thus enhancing the ecological validity of the investigations. Two individuals using AAC were included in the present studies to investigate whether there were differences in the skills that contribute to communicative competence across different AAC users. Previous studies focused on a single AAC user (e.g., Bedrosian et al., 1991) and assumed that the impact of skills would be generalizable to other AAC users. Given the range of characteristics presented by AAC users, the impact of specific skills may vary across AAC users (Light, 1989). It is critical to investigate empirically the impact of specific linguistic, operational, social, and strategic skills across various AAC users to establish the generality (or lack of generality) of results.

Procedures

For each of the 15 studies, the subjects participated in two data collection sessions separated by at least a week. Subjects were assigned to one of two orders of videotape viewing: Order A viewed the videotapes in which the AAC users employed the skill (the 'with skill' condition) during the first data collection session and the videotapes in which the AAC users did not use the skill (the 'without skill' condition) during the second data collection session. Subjects in Order B viewed the 'without skill' condition during the first session and the 'with skill' condition during the second session. The order of videotape viewing was counterbalanced across subjects to control for potential order effects. Assignment of subjects to each order was random with the constraint that the two groups of subjects should present similar demographic characteristics (e.g., gender, age, racial and ethnic background, education, experience in AAC if appropriate).

Each of the data collection sessions lasted approximately an hour. Data collection sessions were conducted individually with the subjects or in small groups. All sessions were held in a quiet, distraction-free room. Subjects were seated so that they could see and hear the television monitor easily, but so that they were not distracted or influenced by other subjects.

During the first data collection session, the researcher provided a brief introduction to the project and then showed the "standard" videotape. The subjects were instructed as follows before viewing the standard video:

> Thank you for taking the time to participate in this research study. I am going to show you a videotape of several different students who use augmentative communication systems to communicate. These systems might include communication books or boards with line drawings or words on them, computer-based communication systems, sign language - any method other than speech to communicate. You do not have to answer any questions about this first video. It is simply to show you the types of communication systems that we are talking about."

When the standard videotape was finished, the researcher then instructed the subjects as follows:

> Next I will show you a videotape of a student who uses augmentative communication systems. In this video, he or she will be interacting with a variety of people. Once you have watched the video, you will be asked to complete a questionnaire about the student who uses augmentative communication. This is the questionnaire that you will be answering after you view the videotape. Please take a moment to read through all the

questions. (Wait while subjects read through the Communicative Competence Scale.) Are there any questions?"

The researcher then showed one of the experimental videotapes for one of the AAC users (the 'with skill' condition for the subjects in Order A; the 'without skill' condition for Order B). Whether the subjects viewed the male or female AAC user first was randomly determined. After the videotape was finished, the subjects were instructed to answer each of the questions on the Communicative Competence Scale. (See the section on Measures for further discussion of the Communicative Competence Scale; the scale is included in Appendix B.) The experimental videotape for the other AAC user was shown next; the same procedures were followed.

The second data collection session was scheduled approximately one week after the first session. During this second session, the researcher started by showing the subjects the experimental videotape for one of the AAC users that was not viewed during session #1 (i.e., the 'without skill' video for Order A and the 'with skill' video for Order B). The researcher then instructed the subjects to complete the Communicative Competence Scale for the AAC user. Following completion of the scale, the subjects then viewed the videotape of the same AAC user in the other skill condition (i.e., the 'with skill' video for Order A and the 'without skill' video for Order B). Subjects were then asked to respond to a forced choice question indicating whether the individual using AAC was a more effective communicator in the first or second videotape observed that day or if there was no difference between the two video tapes. (Please see Appendix C for the Forced Choice Question.) The same procedures were repeated for the second AAC user.

Measures

There were two dependent variables in the studies: the observers' ratings of the communicative competence of the individuals using AAC on the Communicative Competence Scale; and the forced choice selections by the observers. Unfortunately, there were no instruments available at the time of the research that satisfactorily measured the communicative competence of people using AAC. The rating scales used in previous research (e.g., Bedrosian, et al., 1992; Kangas, 1991) were weak psychometrically; reliability and validity of these instruments were not well established. The validity of both of these instruments was subject to debate: both instruments rated communicative competence based on specific skill performances (e.g., the AAC user's rate of communication, the linguistic complexity of messages, etc.), yet to date the skills that contribute to communicative competence for students using AAC have not been reliably

identified. Given that there were no reliable and valid instruments available to measure the communicative competence of students using AAC, it was necessary to develop an instrument within this project. Therefore, a rating scale, employing a 5-point Likert-type scale (cf. Likert, 1932), was developed, as part of this project, to measure the communicative competence of AAC users (see Appendix B for The Communicative Competence Scale).

In order to ensure the validity of the Communicative Competence Scale, a comprehensive literature review was conducted to investigate definitions of communicative competence and to identify underlying constructs to be included in the development of the Communicative Competence Scale. As a result of the literature review, an initial draft of the Communicative Competence Scale was developed based on the classic definition of communicative competence proposed by Hymes (1974): "...competence as to when to speak, when not, and as to what to talk about with whom, when, where, and in what manner" (p. 277). The proposed scale was a Likert type rating scale, including 25 statements regarding the communicative competence of individuals who use AAC, to be judged on a 5 point scale (total possible score of 125). The scale items were constructed based on each of the components of the definition proposed by Hymes: when to speak and when not; what to talk about; with whom; when; where; and in what manner. These components were found to recur repeatedly in the literature as key constructs central to the meaning of communicative competence. The researchers were careful not to assume the importance of specific skills, but to focus instead on desired outcomes.

The proposed Scale was reviewed by an Advisory Panel of leading professionals and consumers within the AAC field to ensure its content validity. The Scale was also reviewed by adults and students (ages 10-15) with no prior experience with students using AAC to ensure that items were clearly worded and were easily understood. The initial draft of the scale was revised based on the feedback received from all sources. The scale was then field tested formally to evaluate its reliability and validity.

The field testing involved three groups of observers: professionals with experience in AAC (n=15); adults with no prior experience in AAC (n=15); and children (ages 10-12) with no prior experience in AAC (n=20). The observers participated in two data collection sessions, separated by an interval of 11-15 days. In the first session, the observers viewed a set of five videotapes of students using AAC interacting with nondisabled partners in various contexts. The students in the videotapes represented various levels of communicative competence. Once the observers had viewed all five videos, they were then shown each of the five videotapes one by one, in a randomly determined order. Following each of the video viewings they were asked to complete

the Communicative Competence Scale rating the communication performance of the student using AAC in the video. In order to investigate the test-retest reliability of the scale scores, the observers all participated in a second data collection session approximately 2 weeks later. At this time, procedures were repeated as for the first session; observers viewed each of the five videos and rated the communicative competence of each student. Following completion of the ratings, the observers were provided with a list of the students in the videotapes and were asked to rank order the five students, from least competent in communication to most competent.

As recommended by Cronbach, Gleser, Nanda and Rajaratnam, 1972), Generalizability theory was used in order to determine the reliability of the measures. Whereas more traditional approaches to reliability interpret only one source of measurement error at a time as error (e.g., raters in inter-rater reliability, items in internal consistency reliability), Generalizability (G) theory considers all possible sources of error, and hence unreliability (Goodwin & Goodwin, 1991). In the G study conducted, observers, items, and time (the first data collection session or the second one, two weeks later) were all investigated as potential sources of measurement error. Results of the GENOVA indicated an overall G-Coefficient for all three groups of observers of 0.91, suggesting highly reliable measures. (It should be noted that the G-coefficient is analogous to the traditional reliability coefficients from classical test theory and ranges from 0.0 to 1.0; it is however a much more conservative estimate of reliability since it considers all possible sources of error simultaneously.). G-studies, considering observers, items, and time as sources of measurement error, were also conducted separately for each of the observer groups (i.e., professionals with experience in AAC, adults with no prior experience, and children with no prior experience). Results indicated the following G-Coefficients: 0.96 for the professionals experienced in AAC; 0.94 for the non-experienced adults; and 0.75 for the non-experienced peers. All three of these G-Coefficients demonstrate levels of acceptable reliability since all sources of error are taken into consideration simultaneously. Results indicated that the measures were highly reliable with adults (experienced or non-experienced) and were moderately reliable with non-experienced children. It is not surprising that the reliability of the measures with children was less than with adults. Students (ages 10-12) are still learning language and communication skills and are still developing metacognitive and metalinguistic skills. They may not have internalized as consistent a definition of communicative competence as their adult counterparts.

In addition to the G-tests, more traditional measures of reliability were also conducted. Test-retest reliability was calculated for the three groups of observers: $r=0.99$ ($p<.01$) for the experienced professionals; $r=0.99$ ($p<.01$) for the non-experienced adults; and $r=0.84$ ($p<.05$) for

the peer group. The internal consistency of the scale was evaluated by computing the split half correlation ($r=0.98$; $p<.01$).

The scale scores were also compared to the rankings of the five students to provide support for the concurrent validity of the scale. Results clearly indicated that the Communicative Competence Scale did serve to differentiate students using AAC who were judged to be competent communicators from those who were judged to be less competent in their communication. In 83% of the cases, there was agreement (plus or minus 1) between the forced choice rankings and the students' relative standings derived from the scale scores.

The second dependent variable in the investigations was the forced choice question. After viewing the two experimental videos for each AAC user (the 'with skill" and the "without skill' conditions), the subjects were asked to respond to the following forced choice question: "In which of the videotapes was the student using AAC a more competent communicator: (a) he/she was a more competent communicator in the first videotape; (b) he/she was a more competent communicator in the second videotape; or (c) he/she was equally competent in the two videos". (See Appendix C for the Forced Choice Question.)

Data Analyses

For each of the 5 investigations, full scale scores on the Communicative Competence Scale (out of a possible 125) were tallied for each observer for each AAC user in each of the experimental conditions ('with skill' or 'without skill'); means and standard deviations were calculated for each of the observer groups. Two way analyses of variance (ANOVA) were conducted for each of the studies to determine: the main effect of the linguistic, operational, social, or strategic behavior under study and the interaction between the effects of AAC user and target skill. The main effect was of interest to determine if the target skill in each investigation was associated with higher ratings of communicative competence. The interaction effect was of interest to investigate if the impact of the skill was consistent across the AAC users who participated in the study, thus providing some insight into the generality of the skill's impact. The main effect of AAC user was not tested. The AAC users who participated in the investigations were intended to be representative of AAC users as a group; their scores in comparison to each other were not of specific interest. Results were reported as statistically significant if the p value was less than .05. Where the interaction between the effects of skill and AAC user was found to be statistically significant, planned analyses of the simple effect of the target skill for each of the AAC users were conducted separately.

The frequencies and proportions of responses from the forced choice questions were summarized for each of the AAC users for the three groups of observers separately. Chi square analyses were used to test differences between the observed and expected frequencies of choices.

Investigation #1: Effect of an Introduction Strategy

This section provides specific information about the research questions, subjects, and materials for Investigation #1 into the effect of an introduction strategy (Light, Binger, Dilg, & Livelsberger, 1996). This information supplements the information provided on the general methodology of all five investigations presented in the previous section. Results are presented for each of the three studies under Investigation #1; these results are discussed with implications for educational and clinical practice, and for future research.

Research Questions for Investigation #1

The independent variable of interest in Investigation #1 was the use of an introduction strategy. For the purpose of this investigation, an introduction strategy was defined as a message employed by the individual who uses AAC when meeting someone new. The message included two components: (a) information about the AAC user's means of communication; and (b) information about what the partner should do to facilitate the interaction. For example, Mary, a 13 year old with cerebral palsy used the following introduction strategy: "Hi. I understand what is said to me, so please speak normally. I use sign language to communicate sometimes. If you don't know sign language, just let me know and I will type out the things I want to say on this computer. You will hear my message spoken out once I finish typing it. Please give me a few minutes to answer. I may be slow, but it's worth waiting for!."

Light (1989) proposed that it is essential for AAC users to develop strategies to put communication partners at ease in interactions. Use of an introduction strategy is one technique to put new partners at ease. An introduction strategy provides new partners with information about what to expect in the interaction and about what they should do to facilitate communication. Although AAC users have reported anecdotally that they use introduction strategies to facilitate their interactions with new partners, to date, there has been no research to investigate the effect of an introduction strategy on the communicative competence of AAC users.

Therefore, the specific research questions for the first investigation were as follows:

1. What is the effect of the use of an introduction strategy on the communicative competence of individuals who use AAC as perceived by professionals with experience in AAC (Study 1.1)?
2. What is the effect of the use of an introduction strategy on the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC (Study 1.2)?
3. What is the effect of the use of an introduction strategy on the communicative competence of individuals who use AAC as perceived by adolescents with no prior experience in AAC (Study 1.3)?

Subjects for Investigation #1

Study #1.1 involved 20 professionals with experience in AAC. Ages for the professionals ranged from 23-47 years (mean = 33 years). The group included 1 male (5%) and 19 females (95%). The majority of the professionals had a graduate degree (85%). Forty percent had 1-5 years of experience in AAC; 40% had 6-10 years; and 20% had more than 10 years of experience. Forty percent had worked with 5-24 individuals who used AAC during their careers; 35% had worked with 25-50 individuals; and 25% had worked with more than 50 individuals who used AAC.

Study #1.2 involved 30 adults, none of whom had prior experience or training in AAC. The adults ranged in age from 22-60 (mean=37 years); 53% were female and 47% were male. The adults represented a range of educational backgrounds, from less than high school to a Masters degree, and a range of job experiences.

Study #1.3 involved 30 adolescents, none of whom had prior experience or training in AAC. The adolescents ranged in age from 11-15 (mean=13;6 years); educational levels ranged from grade 6-10. Sixty percent were female and 40% were male.

Materials for Investigation #1

The female AAC user (H) was videotaped interacting in three different contexts: meeting a new friend in the school cafeteria; asking the school secretary for information; and, asking a stranger on the street for directions. The male AAC user (B) was videotaped interacting in three different contexts: ordering from a waitress in a restaurant; meeting someone new at a friend's house; and, introducing himself to a new teacher at school. All of these contexts involved the

AAC users meeting unfamiliar partners since the introduction strategy would only be used in these types of situations. The videotapes involved interactions with both adults and peers in various situations at home, at school, and in the community. In one set of videotapes, the AAC users used an introduction strategy when they met someone new (the 'with skill' condition). In the other set of videotapes, the AAC users did not use an introduction strategy (the 'without' skill condition). In all other respects, the videotapes were the same.

Results for Investigation #1

Study #1.1 Professionals with experience in AAC. Tables 1 and 2 present the scores on the Communicative Competence Scale for the female and male AAC users respectively in the 'with skill' condition (i.e., using an introduction strategy) and in the 'without skill' condition (i.e., not using an introduction strategy). The mean score for the female AAC user when she used an introduction strategy was 105 out of a possible 125, while the mean score when she did not use an introduction strategy was 92.6. The mean score for the male AAC user was 109.2 in the 'with skill' condition and 95.8 in the 'without skill' condition. The ANOVA results showed a statistically significant main effect for skill condition ($F=32.3$; $df= 1, 19$; $p<.05$); the interaction between skill condition and AAC user was not statistically significant. These results indicate that the use of an introduction strategy contributed to positive perceptions of communicative competence from professionals with experience in AAC for both of the AAC users. These results were confirmed by the forced choice data. Eighty five percent of the professionals indicated that the female AAC user was a more competent communicator when she used an introduction strategy than when she did not ($\chi^2 =19.4$, $df=2$, $p<.05$). Ninety percent of the professionals indicated that the male AAC user was more competent in the 'with skill' condition than in the 'without skill' condition ($\chi^2=22.6$, $df=2$, $p<.05$).

Table 1

Scores on the Communicative Competence Scale from Professionals With Experience in AAC for the Female AAC User: With and Without an Introduction Strategy.

Subject	Introduction Strategy	Without Strategy
1	113	114
2	102	103
3	99	95
4	104	102
5	93	86
6	116	113
7	110	87
8	114	107
9	86	76
10	79	67
11	101	99
12	125	107
13	107	100
14	102	80
15	120	82
16	113	100
17	108	64
18	120	105
19	86	80
20	103	84
Mean	105.0	92.6
SD	12.2	14.7

Table 2

Scores on the Communicative Competence Scale from the Professionals With Experience in AAC for the Male AAC User: With and Without an Introduction Strategy.

Subject	Introduction Strategy	Without Strategy
1	114	108
2	121	90
3	104	100
4	102	113
5	95	90
6	118	120
7	106	102
8	119	99
9	112	115
10	100	74
11	100	77
12	124	112
13	100	82
14	101	84
15	119	100
16	112	102
17	102	63
18	120	100
19	92	77
20	124	107
Mean	109.2	95.8
SD	10.2	15.5

Study #1.2 Adults with no prior experience in AAC. Tables 3 and 4 present the scores on the Communicative Competence Scale from the adults with no prior experience in AAC for the female and male AAC users respectively. The mean score for the female AAC user was 99.9 in the 'with skill' condition and 90.4 in the 'without skill' condition. Similarly the mean score for the male AAC user in the condition with the introduction strategy was 101.6 compared to a mean score of 94.6 in the condition without the introduction strategy. The ANOVA revealed a statistically significant main effect for the skill condition ($F=17.7$; $df=1, 29$; $p<.05$); the interaction between the effects of skill and AAC user was not statistically significant. These results were confirmed by the forced choice data: 73% of the adults indicated that the female AAC user was a more competent communicator in the condition with the introduction strategy than in that without ($\chi^2=24.8$, $df=2$, $p<.05$); 77% of the adults indicated that the male AAC user was more competent in the 'with skill' condition than in the 'without skill' condition ($\chi^2=27.8$, $df=2$, $p<.05$).

Study #1.3 Adolescents with no prior experience in AAC. Tables 5 and 6 present the scores on the Communicative Competence Scale from the adolescents with no prior experience in AAC for the female and male AAC users respectively. The mean scores for the female AAC user in the 'with skill' and 'without skill' conditions were 102.5 and 89.1 respectively; the mean scores for the male AAC user in the 'with skill' and 'without skill' conditions were 104.1 and 93.4 respectively. As for the other two studies, the results of the ANOVA revealed a statistically significant main effect for the skill condition ($F=35.8$; $df=1,29$; $p<.05$) in the absence of a statistically significant interaction between the effects of skill and AAC user. Results from the forced choice questions confirmed these results: the overwhelming majority of the adolescents chose the female AAC user and the male AAC user in the 'with skill' condition (90% and 87% respectively) as more competent than in the 'without skill' condition. Chi square analyses of the forced choice data were statistically significant for both AAC users ($\chi^2=43.8$, $df=2$, $p<.05$ for the female AAC user and $\chi^2=38.4$, $df=2$, $p<.05$ for the male AAC user).

Table 3

Scores on the Communicative Competence Scale from the Adults With No Prior Experience in AAC for the Female AAC User: With and Without an Introduction Strategy.

Subject	Introduction Strategy	Without Strategy
1	102	103
2	86	88
3	109	99
4	118	96
5	95	94
6	107	90
7	107	76
8	92	92
9	79	71
10	105	95
11	96	65
12	87	84
13	103	95
14	88	76
15	103	100
16	104	106
17	122	96
18	94	87
19	101	91
20	125	101
21	96	83
22	120	121
23	102	92
24	97	100
25	82	65
26	97	96
27	103	91
28	92	91
29	78	77
30	107	91
Mean	99.9	90.4
SD	11.9	12.1

Table 4

Scores on the Communicative Competence Scale from the Adults With No Prior Experience in AAC for the Male AAC User: With and Without an Introduction Strategy.

Subject	Introduction Strategy	Without Strategy
1	77	108
2	91	100
3	98	97
4	99	93
5	91	94
6	103	92
7	92	81
8	97	95
9	78	83
10	106	87
11	110	100
12	97	90
13	95	94
14	100	52
15	86	95
16	100	108
17	123	100
18	105	93
19	122	95
20	125	105
21	97	97
22	119	123
23	109	93
24	124	100
25	82	70
26	123	121
27	94	97
28	105	97
29	90	97
30	110	90
Mean	101.6	94.6
SD	13.6	13.2

Table 5

Scores on the Communicative Competence Scale from the Adolescents With No Prior Experience in AAC for the Female User: With and Without an Introduction Strategy.

Subject	Introduction Strategy	Without Strategy
1	83	74
2	101	100
3	105	88
4	101	97
5	107	92
6	113	68
7	109	91
8	100	89
9	123	77
10	99	80
11	121	112
12	95	86
13	115	97
14	119	72
15	103	91
16	114	100
17	96	87
18	100	99
19	111	82
20	86	72
21	111	105
22	117	95
23	95	90
24	96	100
25	86	84
26	90	91
27	89	78
28	93	94
29	82	87
30	116	95
Mean	102.5	89.1
SD	11.8	10.5

Table 6

Scores on the Communicative Competence Scale from the Adolescents With No Prior Experience in AAC for the Male AAC User: With and Without an Introduction Strategy.

Subject	Introduction Strategy	Without Strategy
1	75	61
2	103	99
3	98	96
4	102	93
5	106	89
6	113	113
7	100	85
8	108	91
9	123	101
10	91	78
11	105	102
12	118	88
13	113	99
14	110	65
15	96	98
16	125	120
17	116	121
18	125	109
19	103	91
20	96	73
21	113	103
22	122	91
23	96	95
24	94	107
25	91	83
26	106	94
27	86	86
28	88	85
29	88	87
30	114	100
Mean	104.1	93.4
SD	12.7	13.8

Discussion for Investigation #1

Results for the three studies indicated that the use of an introduction strategy impacted positively on the communicative competence of AAC users as perceived by professionals with experience in AAC, adults with no prior experience in AAC, and adolescents with no prior experience in AAC. Results were consistent across both of the AAC users. These results confirm the hypothesis proposed by Light (1989) that AAC users should develop strategies to put their partners at ease in order to become competent communicators. Research with other populations who have disabilities (e.g., individuals with physical disabilities, individuals who stutter, individuals with hearing impairments, individuals with laryngectomies) found that these individuals were perceived more positively when they acknowledged their disability to new partners; partners reported that they felt less discomfort and uncertainty in the interactions (Hastorf, Wildfogel, & Cassman, 1979; Blood & Blood, 1982; Blood & Blood, 1983; Collins & Blood, 1990). While these studies focused on the effect of simply acknowledging the disability to a new partner, the current study focused instead on providing the partner with information on how the individual who uses AAC communicates and on what the partner should do to facilitate the interaction. Given the complexities of communication via AAC and the inherent differences in the partner's role, simply acknowledging the presence of a disability or the use of an AAC system may not be sufficient to put partners at ease. Furthermore, many individuals who use AAC indicated that they felt no need to "apologize" for their disability; they preferred to educate new partners by providing necessary information instead (M. Williams, personal communication, February 1993).

The results of the three studies under Investigation #1 provide clear empirical evidence that learning to use an introduction strategy should be targeted as a goal for AAC users who are interacting with unfamiliar people. Use of an introduction strategy should enhance the communicative competence of the AAC user. The introduction strategy should include information on the individual's means of communication and information on what the partner should do to facilitate the interaction. As a next step, instructional programs need to be developed to teach the use of an introduction strategy to AAC users; these programs need to be evaluated to establish their effectiveness. Investigation #6 under Objective #2 in this project developed, implemented, and evaluated an instructional program to teach the use of an introduction strategy. Results of this research are presented in the section on Objective #2.

Investigation #2: Effect of Partner-focused Questions

This section provides specific information about the research questions, independent variable, subjects, and materials for Investigation #2 into the effect of partner-focused questions (Light, Corbett, Gullapalli, & Lepkowski, 1995). This information supplements the general information provided on the methodology of all five investigations presented earlier. Results are presented for each of the three studies under Investigation #2; these results are discussed with implications for educational and clinical practice, and for future research.

Research Questions for Investigation #2

The independent variable of interest in Investigation #2 was the use of partner-focused questions, that is, questions about the conversational partner and his/her experiences (e.g., "How was your weekend?", "What do you think?", "What's up?", "What are you doing this weekend?", "What do you want to do?"). Light (1989) proposed that communicative competence for AAC users rests on skills in a variety of domains, including the social domain. One of the sociorelational skills that Light (1989) suggested was important to the development of communicative competence was 'other-orientation'. "Other-orientation" has been defined as attending to one's communication partner by directing questions and comments toward the partner and his/her interests (Spitzberg & Cupach, 1984). Feingold (1977) investigated the relationship between other orientation and communicative competence for nondisabled communicators and concluded that effective communicators are 'other oriented'.

To date, no research has investigated the effect of other-orientation skills (as evidenced by the use of partner-focused questions) on the communicative competence of AAC users. Therefore, the specific research questions for Investigation #2 were as follows:

1. What is the effect of the use of partner-focused questions on the communicative competence of individuals who use AAC as perceived by professionals with experience in AAC (Study #2.1)?
2. What is the effect of the use of partner-focused questions on the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC (Study #2.2)?
3. What is the effect of the use of partner-focused questions on the communicative competence of individuals who use AAC as perceived by adolescents with no prior experience in AAC (Study #2.3)?

Subjects for Investigation #2

Study #2.1 involved 20 professionals with experience in AAC. Ages for the professionals ranged from 22-49 years (mean = 33 years). The group included 3 males (15%) and 17 females (85%). The majority of the professionals had a graduate degree (70%). Forty percent had 1-5 years of experience in AAC; 35% had 6-10 years; and 25% had more than 10 years of experience. The majority (65%) had worked with 5-24 individuals who used AAC during their careers; 10% had worked with 25-50 individuals; and 25% had worked with more than 50 individuals who used AAC.

Study #2.2 involved 30 adults, none of whom had prior experience or training in AAC. The adults ranged in age from 20- 60 years (mean=31 years); 47% were female and 53% were male. The adults represented a range of educational backgrounds, from less than high school to a Masters degree.

Study #2.3 involved 30 adolescents, none of whom had prior experience or training in AAC. The adolescents ranged in age from 14-18 years old (mean=15;6 years); educational levels ranged from grade 9-12. Forty three percent were female and 57% were male.

Materials for Investigation #2

The female AAC user (H) was videotaped interacting in three different contexts: meeting a new friend in the school cafeteria; looking at a magazine with an old friend; and, planning a shopping trip with her aunt. The male AAC user (B) was videotaped interacting in three different contexts: talking to a teacher after class; talking about an exam with peers at school; and, meeting a new friend. The interactions involved both adults and peers, familiar and unfamiliar, in various situations at home, at school, and in the community. In one set of videotaped interactions, the AAC user asked their partners partner-focused questions when there was the opportunity to do so (the 'with skill' condition). In the other set of videotapes, the AAC users did not ask partner-focused questions (the 'without skill' condition). In all other respects, the videotapes were the same.

Results for Investigation #2

Study #2.1 Professionals with experience in AAC. Tables 7 and 8 present the scores on the Communicative Competence Scale for the female and male AAC users respectively in the 'with skill' condition (i.e., asking partner-focused questions) and in the 'without skill' condition (i.e., not asking partner-focused questions). The mean score for the female AAC user in the 'with skill' condition was 103.5, while the mean score in the 'without skill' condition was 96.5. The mean score for the male AAC user was 103.6 in the 'with skill' condition and 96.8 in the 'without skill' condition. The ANOVA results showed a statistically significant main effect for skill condition ($F=14.5$; $df= 1, 19$; $p<.05$); the interaction between skill condition and AAC user was not statistically significant. These results indicate that asking partner-focused questions contributed to positive perceptions of communicative competence from professionals with experience in AAC for both of the AAC users. These results were confirmed by the forced choice data. For both H and B, 75% of the professionals indicated that they were more competent communicators when they asked partner-focused questions than when they did not ($\chi^2=17.7$, $df=2$, $p<.05$ for both of the AAC users).

Study #2.2 Adults with no prior experience in AAC. Tables 9 and 10 present the scores on the Communicative Competence Scale from the adults with no prior experience in AAC for the female and male AAC users respectively. The mean score for the female AAC user was 97.3 in the 'with skill' condition and 95.3 in the 'without skill' condition. The mean score for the male AAC user in the 'with skill' condition was 99.4 compared to a mean score of 99.5 in the 'without skill' condition. The ANOVA revealed that neither the main effect for skill nor the interaction was statistically significant. However, the majority of the adults indicated in the forced choice question that both the female AAC user and the male AAC user were more competent communicators in the condition with partner-focused questions than in the condition without. The chi square analyses for both AAC users were statistically significant. In H's case, 60% of the adults chose the 'with skill' video as the one in which she was the more competent communicator; 33% reported no difference between the two videos; only 7% chose the 'without skill' video ($\chi^2=12.8$, $df=2$, $p<.05$). In B's case, 67% of the adults selected the 'with skill' video as the one in which he was the more competent communicator; 23% reported no difference between the two videos; and 10% selected the 'without skill' video ($\chi^2=15.8$, $df=2$, $p<.05$). Anecdotal comments from the adults who selected the 'with skill' videotapes revealed strong preferences for this condition; the adults commented that the AAC users seemed more interested and involved in the conversations when they used partner-focused questions than when they did not.

Table 7

Scores on the Communicative Competence Scale from the Professionals With Experience in AAC for the Female AAC User: With and Without Partner-Focused Questions.

Subject	With Skill	Without Skill
1	115	111
2	108	85
3	105	84
4	92	94
5	109	100
6	105	103
7	117	90
8	97	90
9	98	102
10	110	112
11	77	81
12	96	94
13	100	103
14	113	94
15	90	86
16	98	91
17	117	114
18	97	97
19	120	104
20	106	95
Mean	103.5	96.5
SD	10.7	9.5

Table 8

Scores on the Communicative Competence Scale from the Professionals With Experience in AAC for the Male AAC User: With and Without Partner-Focused Questions.

Subject	With Skill	Without Skill
1	117	100
2	110	84
3	105	80
4	106	94
5	106	104
6	99	100
7	108	111
8	96	94
9	97	102
10	115	113
11	77	83
12	106	102
13	92	86
14	98	83
15	93	80
16	105	94
17	120	114
18	99	97
19	125	112
20	97	102
Mean	103.6	96.8
SD	11.0	11.2

Table 9

Scores on the Communicative Competence Scale from the Adults With No Prior Experience in AAC for the Female AAC User: With and Without Partner-Focused Questions.

Subject	With Skill	Without Skill
1	98	97
2	90	93
3	93	94
4	95	93
5	95	100
6	112	113
7	102	104
8	102	101
9	84	76
10	92	86
11	85	72
12	95	78
13	99	88
14	88	88
15	82	88
16	110	106
17	73	78
18	110	110
19	89	82
20	107	106
21	103	104
22	119	115
23	102	98
24	121	114
25	95	95
26	86	100
27	91	91
28	102	105
29	82	79
30	117	104
Mean	97.3	95.3
SD	11.8	11.9

Table 10

Scores on the Communication Competence Scale from the Adults With No Prior Experience in AAC for the Male AAC User: With and Without Partner-Focused Questions.

Subject	With Skill	Without Skill
1	91	94
2	92	95
3	92	91
4	99	95
5	96	100
6	109	112
7	114	108
8	113	110
9	102	96
10	89	79
11	77	75
12	94	88
13	108	106
14	99	108
15	104	83
16	111	114
17	101	94
18	99	104
19	71	79
20	111	116
21	106	115
22	120	115
23	110	125
24	102	105
25	97	94
26	89	101
27	93	95
28	106	100
29	90	90
30	98	97
Mean	99.4	99.5
SD	10.8	12.2

Study #2.3 Adolescents with no prior experience in AAC. Tables 11 and 12 present the scores on the Communicative Competence Scale from the adolescents with no prior experience in AAC for the female and male AAC users respectively. The mean scores for the female AAC user in the 'with skill' and 'without skill' conditions were 88.0 and 87.0 respectively; the mean scores for the male AAC user in the 'with skill' and 'without skill' conditions were 91.3 and 91.6 respectively. According to the ANOVA, neither the main effect for skill nor the interaction between the effects of skill and AAC user was statistically significant. Results from the forced choice questions confirmed these results: the majority of the adolescents indicated that there was no difference in H's or B's communication skills in the two videos. In H's case, 57% indicated that there was no difference between the two videotapes; 23% selected the 'with skill' video as the one in which she was a more competent communicator; and 20% selected the 'without skill' video. In the case of the male AAC user, 53% indicated that there was no difference in the two videotapes; 27% selected the 'with skill' video; and 20% chose the 'without skill' video.

Discussion for Investigation #2

Results for the studies in Investigation #2 were consistent across the two AAC users. However, the same pattern of results was not found across the three groups of observers: the effect of partner-focused questions depended on who was making the judgement of communicative competence. According to the professionals, partner-focused questions impacted the communicative competence of AAC users positively. However, results for the adults with no experience in AAC were equivocal: the scale scores did not reflect statistically significant differences between the two skill conditions, but the forced choice data indicated a clear, statistically significant preference for the condition where the AAC users asked partner-focused questions. It is possible that the Communicative Competence Scale was not sensitive enough to pick up the perceived differences between the two skill conditions for the adults. The Communicative Competence Scale measured communicative competence globally; the differences in the use of partner-focused questions across the two skill conditions may not have been enough on their own to cause changes in global ratings on the Likert-type scale. However, the forced choice data suggested that the differences were perceived by the adults without prior experience in AAC; the majority of the adults indicated a clear preference for the use of partner-focused questions. Future research is required to investigate the impact of partner-focused questions on the communicative competence of AAC users as perceived by adults without experience in AAC to determine unequivocally whether this skill is a relevant instructional goal.

Table 11

Scores on the Communicative Competence Scale from the Adolescents With No Prior Experience in AAC for the Female AAC User: With and Without Partner-Focused Questions.

Subject	With Skill	Without Skill
1	79	74
2	105	101
3	95	98
4	83	84
5	97	89
6	99	101
7	93	71
8	97	94
9	96	95
10	76	54
11	86	83
12	80	82
13	85	83
14	88	95
15	95	85
16	80	89
17	98	107
18	100	102
19	102	92
20	95	85
21	91	101
22	91	79
23	89	95
24	91	88
25	79	77
26	67	82
27	84	97
28	74	76
29	76	68
30	70	81
Mean	88.0	87.0
SD	9.9	11.8

Table 12

Scores on the Communicative Competence Scale from the Adolescents With No Prior Experience in AAC for the Male AAC User: With and Without Partner-Focused Questions.

Subject	With Skill	Without Skill
1	89	85
2	100	94
3	87	88
4	69	79
5	92	92
6	98	93
7	101	89
8	100	103
9	95	95
10	101	88
11	90	80
12	84	83
13	99	96
14	98	94
15	101	98
16	95	110
17	113	123
18	90	89
19	102	94
20	100	108
21	100	99
22	84	87
23	86	107
24	93	95
25	84	89
26	75	71
27	93	96
28	74	75
29	71	76
30	74	72
Mean	91.3	91.6
SD	10.7	11.7

Results of Study #2.3 indicated that partner-focused questions did not impact the perceptions of communicative competence held by the adolescents with no prior experience in AAC. These results differ from the results of the first two studies involving adults. The results may reflect developmental differences in the observer groups judging the communicative competence of the AAC users. Adolescents may still be in a stage of 'egocentric' development where they may neither expect nor value 'other orientation' skills. Valuing the skill of 'other orientation' may not emerge until later in adulthood with the development of greater social maturity.

The results of these studies suggest that learning to ask partner-focused questions may be an important goal for AAC users in their interactions with adults; this skill may not be required in interactions with adolescents and younger children. Future research is required before definite educational and clinical implications can be determined. This research should investigate further the impact of partner-focused questions on communicative competence and the relationship of partner-focused questions to other skills within the communication process. Future research should be conducted to evaluate the efficacy of instruction to teach partner-focused questions to AAC users. This research should include social validation of the outcomes of the instruction to further investigate whether partner-focused questions impact positively on the communicative competence of AAC users. Investigation #7 addressed the evaluation and social validation of an instructional program to teach the use of partner-focused questions to AAC users (see Objective #2).

Investigation #3: Effect of Nonobligatory Turns

This section presents specific information about the research questions, independent variable, subjects, and materials for Investigation #3 into the effect of the use of nonobligatory turns on the communicative competence of students who use AAC (Light, Binger, Corbett, Gathercole, Greiner, & Seich, 1995). This information supplements the general information provided on the methodology of all five investigations presented earlier in this report. Results are presented for each of the three studies under Investigation #3; these results are discussed with implications for educational and clinical practice, and for future research.

Research Questions for Investigation #3

The independent variable of interest in Investigation #3 was the use of nonobligatory turns in social conversations, that is, turns that follow a partner's comment or statement (as opposed to turns that follow a partner's question, i.e., obligatory turns). The research indicates that many AAC users only take their obligatory turns in interactions; they forfeit their nonobligatory turns (Light, Collier, & Parnes, 1985a). Yet Light (1989) suggested that AAC users who are perceived as competent communicators participate frequently in interactions. One way to increase participation in social conversations is to encourage AAC users to take not only their obligatory turns, but also their nonobligatory turns.

To date, no research has investigated the effect of nonobligatory turns on the communicative competence of AAC users. Therefore, the specific research questions for Investigation #3 were as follows:

1. What is the effect of the use of nonobligatory turns on the communicative competence of individuals who use AAC as perceived by professionals with experience in AAC (Study #3.1)?
2. What is the effect of the use of nonobligatory turns on the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC (Study #3.2)?
3. What is the effect of the use of nonobligatory turns on the communicative competence of individuals who use AAC as perceived by adolescents with no prior experience in AAC (Study #3.3)?

Within these three research studies, nonobligatory turns were limited to interjections that carried minimal linguistic content (e.g., "Cool", "Awesome", "No way", "Really?", etc). More complex nonobligatory turns were not included, since frequency of turn taking (the independent variable of interest in these studies) would then be confounded by differences in the amount of linguistic information conveyed by the students using AAC across the two experimental conditions. By limiting the nonobligatory turns to interjections that carried minimal linguistic content, the studies attempted to isolate the issue of turn taking frequency from the issue of linguistic content.

Subjects for Investigation #3

Study #3.1 involved 20 professionals with experience in AAC. Ages for the professionals ranged from 25-59 years (mean = 39 years). The group included 2 males (10%) and 18 females (90%). The majority of the professionals had a graduate degree (55%). Thirty percent had 1-5 years of experience in AAC; 35% had 6-10 years; and, 30% had more than 10 years of experience. The majority (60%) had worked with 5-24 individuals who used AAC during their careers; 15% had worked with 25-50 individuals; and, 25% had worked with more than 50 individuals who used AAC.

Study #3.2 involved 30 adults, none of whom had prior experience or training in AAC. The adults ranged in age from 19-71 years (mean=31 years); 60% were female and 40% were male. The adults represented a range of educational backgrounds, from less than high school to a Masters degree.

Study #3.3 involved 30 adolescents, none of whom had prior experience or training in AAC. The adolescents ranged in age from 14-18 years old (mean=15;5 years); educational levels ranged from grade 9-12. Forty seven percent were female and 53% were male.

Materials for Investigation #3

The female AAC user (H) was videotaped interacting in three different contexts: meeting a new friend in the school cafeteria; looking at a magazine with an old friend; and, planning a shopping trip with her aunt. The male AAC user (B) was videotaped interacting in three different contexts: talking to a teacher after class; talking with friends in the cafeteria; and, meeting a new friend. The interactions involved both adults and peers, familiar and unfamiliar, in various situations at home, at school, and in the community. In one set of videotapes, the individuals who used AAC took their obligatory and their nonobligatory turns in the interactions (the 'with skill' condition); nonobligatory turns were limited to interjections that carried minimal linguistic content. In the other set of videotapes, the AAC users took only their obligatory turns; they forfeited their nonobligatory turns (the 'without skill' condition). In all other respects, the videotaped interactions were the same.

Results for Investigation #3

Study #3.1 Professionals with experience in AAC. Tables 13 and 14 present the scores on the Communicative Competence Scale for the female and male AAC users respectively in the 'with skill' condition (i.e., taking nonobligatory turns) and in the 'without skill' condition (i.e., forfeiting nonobligatory turns). The mean score for the female AAC user in the 'with skill' condition was 90.7, while the mean score in the 'without skill' condition was 93.9. The mean score for the male AAC user was 102.3 in the 'with skill' condition and 94.6 in the 'without skill' condition. The ANOVA results showed a statistically significant interaction between skill condition and AAC user ($F=8.3$; $df=1,19$; $p<.05$), indicating that the effect of the use of nonobligatory turns was not consistent across the two AAC users. Planned analyses were conducted to determine the simple effect of the use of nonobligatory turns for the female and male AAC users separately. For H, the simple effect of the skill condition was not statistically significant; however, for B, the simple effect of the skill condition was statistically significant ($F=7.95$; $df=1,19$; $p<.05$). These results indicate that taking nonobligatory turns positively impacts the communicative competence of AAC users as perceived by professionals with experience in AAC, but only for some AAC users; for other AAC users, the use of nonobligatory turns may have no impact on their communicative competence. These results were confirmed by the forced choice data. For the female AAC user (H), 50% of the professionals indicated that there was no difference between the two videotapes; 30% indicated that H was a more competent communicator when she took nonobligatory turns; and 20% indicated that she was a more competent communicator when she forfeited her nonobligatory turns. In contrast, 80% of the professionals indicated that B (the male AAC user) was a more competent communicator when he took his nonobligatory turns; only 10% felt that he was more competent in the 'without skill' condition; and, 10% reported that there was no difference between the two conditions ($\chi^2 = 19.6$, $df=2$, $p<.05$).

Study #3.2 Adults with no prior experience in AAC. Tables 15 and 16 present the scores on the Communicative Competence Scale from the adults with no prior experience in AAC for the female and male AAC user respectively. The mean score for the female AAC user was 92.2 in the 'with skill' condition and 92.6 in the 'without skill' condition. The mean score for the male AAC user in the condition with nonobligatory turns was 101.7 compared to a mean score of 94.6 in the condition without nonobligatory turns. The ANOVA revealed a statistically significant interaction between skill condition and AAC user ($F=15.6$; $df=1, 29$; $p<.05$), suggesting that the effect of the skill condition was not consistent across the two AAC users.

Table 13

Scores on the Communicative Competence Scale from Professionals With Experience in AAC for the Female AAC User: With and Without Nonobligatory Turns.

Subject	With Nonobligatory Turns	Without Nonobligatory Turns
1	113	106
2	77	102
3	106	94
4	100	100
5	110	97
6	102	92
7	114	109
8	83	80
9	93	93
10	73	92
11	91	102
12	92	103
13	68	71
14	84	90
15	79	71
16	75	104
17	90	102
18	88	96
19	90	94
20	86	80
Mean	90.7	93.9
SD	13.4	10.9

Table 14

Scores on the Communicative Competence Scale from Professionals With Experience in AAC for the Male AAC User: With and Without Nonobligatory Turns.

Subject	With Nonobligatory Turns	Without Nonobligatory Turns
1	119	115
2	113	101
3	105	86
4	100	104
5	116	122
6	104	85
7	123	110
8	101	85
9	88	91
10	119	104
11	97	92
12	92	97
13	73	90
14	92	94
15	94	90
16	92	92
17	99	65
18	101	91
19	105	87
20	113	91
Mean	102.3	94.6
SD	12.4	12.4

Table 15

Scores on the Communicative Competence Scale from the Adults With No Prior Experience in AAC for the Female AAC User: With and Without Nonobligatory Turns.

Subject	With Nonobligatory Turns	Without Nonobligatory Turns
1	118	118
2	102	103
3	111	92
4	100	92
5	94	97
6	84	86
7	102	95
8	96	91
9	79	83
10	92	98
11	92	95
12	57	34
13	84	83
14	80	82
15	84	89
16	95	106
17	100	87
18	93	97
19	93	95
20	95	94
21	97	92
22	91	94
23	98	96
24	95	93
25	96	94
26	79	94
27	99	123
28	95	95
29	72	87
30	93	93
Mean	92.2	92.6
SD	11.5	14.2

Table 16

Scores on the Communicative Comptence Scale from the Adults With No Prior Experience in AAC for the Male AAC User: With and Without Nonobligatory Turns.

Subject	With Nonobligatory Turns	Without Nonobligatory Turns
1	117	119
2	116	116
3	115	108
4	97	95
5	99	103
6	83	87
7	108	99
8	103	98
9	87	84
10	97	98
11	98	97
12	61	40
13	92	74
14	86	79
15	95	95
16	116	104
17	116	104
18	104	102
19	98	92
20	120	94
21	119	91
22	91	88
23	119	93
24	111	95
25	120	118
26	100	89
27	100	99
28	93	87
29	87	86
30	104	104
Mean	101.7	94.6
SD	13.8	14.7

Planned analyses were conducted to determine the simple effect of skill condition for the each of the AAC users separately. As with Study #3.1, the simple effect of the skill condition was not statistically significant for the female AAC user; however, it was statistically significant for the male AAC user ($F= 18.57$; $df=1, 29$; $p<.05$). These results were confirmed by the forced choice data. In H's case, the majority of the adults (63%) indicated that there was no difference in the two videotapes; 13% preferred the 'with skill' video, while 23% selected the 'without skill' video as the one in which H was a more competent communicator. In B's case, the majority of the adults (57%) selected the 'with skill' video as the one in which B was a more competent communicator; 23% chose the 'without skill' video; and, 20% reported no difference between the two videos ($\chi^2=7.4$, $df=2$, $p<.05$).

Study #3.3 Adolescents with no prior experience in AAC. Tables 17 and 18 present the scores on the Communicative Competence Scale from the adolescents with no prior experience in AAC for the female and male AAC user respectively. The mean scores for the female AAC user in the 'with skill' and 'without skill' conditions were 87.2 and 87.7 respectively; the mean scores for the male AAC user in the 'with skill' and 'without skill' conditions were 91.7 and 94.0 respectively. According to the ANOVA, neither the main effect for skill nor the interaction between skill and AAC user was statistically significant. Results from the forced choice questions confirmed the results on the Communicative Competence Scale for the female AAC user (H), but not for the male (B). For H, only 20% of the adolescents indicated that H was a more competent communicator in the video where she took nonobligatory turns; 33% indicated that she was more competent in the video where she forfeited these turns; 47% of the adolescents reported that there was no difference in H's communicative competence in the two videos. In B's case, however, 67% indicated that he was a more competent communicator in the video where he took his nonobligatory turns; 20% indicated that there was no difference between the two videotapes; and, 13% selected the 'without skill' video ($\chi^2=15.2$, $df=2$, $p<.05$).

Table 17

Scores for the Communicative Competence Scale from the Adolescents With No Prior Experience in AAC for the Female AAC User: With and Without Nonobligatory Turns.

Subject	With Nonobligatory Turns	Without Nonobligatory Turns
1	91	90
2	83	73
3	91	90
4	88	92
5	107	98
6	107	94
7	95	94
8	84	100
9	87	112
10	80	76
11	94	88
12	80	79
13	71	70
14	89	86
15	93	93
16	91	91
17	70	86
18	103	94
19	78	87
20	91	83
21	99	93
22	65	92
23	61	73
24	110	88
25	85	86
26	92	94
27	57	67
28	81	79
29	96	96
30	97	88
Mean	87.2	87.7
SD	13.1	9.6

Table 18

Scores on the Communicative Competence Scale from the Adolescents With No Prior Experience in AAC for the Male AAC User: With and Without Nonobligatory Turns.

Subject	With Nonobligatory Turns	Without Nonobligatory Turns
1	96	94
2	81	73
3	108	102
4	106	117
5	97	97
6	114	92
7	95	94
8	100	101
9	101	123
10	80	83
11	114	117
12	80	78
13	97	84
14	98	95
15	97	95
16	70	74
17	88	98
18	106	101
19	89	90
20	91	93
21	91	92
22	55	74
23	63	75
24	114	98
25	92	90
26	95	106
27	78	103
28	73	76
29	94	94
30	89	111
Mean	91.7	94.0
SD	14.5	13.2

Discussion for Investigation #3

Results for Investigation #3 were not consistent across the two AAC users, suggesting that skills that contribute to communicative competence may not always be generalizable across AAC users. For both of the adult groups (professionals with experience in AAC and adults with no prior experience in AAC), taking nonobligatory turns positively impacted the communicative competence of the male AAC user. For the adolescent group, the results were not as clear cut: the analysis of the scores on the Communicative Competence Scale for the male AAC user was not statistically significant, but the analysis of the forced choice data for the male was.

For all three groups of observers (professionals with experience in AAC, and adults and adolescents with no prior experience in AAC), analyses of both the scores on the Communicative Competence Scale and the forced choice data indicated that the use of nonobligatory turns did not contribute positively to the communicative competence of the female AAC user. It is not possible to establish a definitive explanation for the discrepancy in the results across the two AAC users. There are, however, two potential hypotheses that should be considered. The two AAC users shared many characteristics: both had cerebral palsy; both used the same computer-based voice output system to communicate. The AAC users were of different genders and ages, however, and they communicated at different rates, with the male AAC user demonstrating significantly faster turn transfer rates (mean turn transfer rate of less than 5 seconds) than the female AAC user (mean turn transfer rate of greater than 17 seconds). It is possible that age or gender influenced the adults' and adolescents' perceptions of the communicative competence of the AAC users; the observers may have perceived that increased participation was desirable from a male or from an older individual (such as B), but not from a female or from a younger individual (such as H). However, the explanatory comments provided by the observers at the end of the three studies suggested that it was rate that explained the differential impact of nonobligatory turns on the perceptions of competence. The male AAC user took his nonobligatory turns quickly; the observers reacted positively and perceived this AAC user as a more competent communicator when he participated more frequently. However, the female AAC user took a longer time to produce her nonobligatory turns. Whatever positive effect her increased participation may have had on the observers' perceptions of her communicative competence seemed to be nullified by the negative effect of waiting for her to take these turns. Further research is required to ascertain whether the use of nonobligatory turns does interact with the AAC users' rate of communication. The results of this future research will allow conclusions to be drawn about the impact of the effect of nonobligatory turns on the communicative competence of AAC users. For now it seems

that the use of nonobligatory turns is an important goal for AAC users who are able to communicate at efficient rates. The use of nonobligatory turns that are only minimal interjections may not be an important goal for individuals who use AAC and who communicate at slower rates. Further research should explore that impact of nonobligatory turns that carry greater linguistic content as well. While the minimal nonobligatory turns investigated in this study did not positively impact the perceived communicative competence of the AAC user with a slower rate of communication, the use of nonobligatory turns that carried greater linguistic content might have impacted perceptions of her communicative competence more positively. The minimal interjections may not have been worth the extra wait time since they contributed only minimally to the interaction. Observers might have been more willing to tolerate the extra wait time if the turns had carried more linguistic content.

Future research is required to develop, implement, and evaluate instructional programs to teach AAC users with efficient turn transfer rates to take nonobligatory turns, thus increasing their participation in interactions. Outcomes of this research should be socially validated to further establish the value of this goal for AAC users with efficient turn transfer rates. This research was undertaken as Investigation #8 under Objective #2.

Investigation #4:
The Effect of Grammatically Complete Versus Telegraphic Messages

This section presents specific information about the research questions, independent variable, subjects, and materials for Investigation #4 into the effect of grammatically complete versus telegraphic messages (Light, Beer, Buchert, Casey, DiMarco, & Dolan, 1995). This specific methodological information supplements the general information provided on the methodology of all five investigations in the previous section. Results are presented for each of the three studies under Investigation #4; these results are discussed with implications for educational and clinical practice, and for future research.

Research Questions for Investigation #4

The independent variable of interest in Investigation #4 was the use of grammatically complete versus telegraphic messages by individuals who use AAC. Grammatically complete messages were defined as messages that included all of the content words and all of the functors required grammatically within the conversational context; telegraphic messages included the

salient content words in the message, but omitted the functors. For example, if the communication partner asked the AAC user, "What are you doing this summer?", in the grammatically complete condition, the AAC user would reply "I'm going to camp in Colorado", while in the telegraphic condition, he/she would reply, "Camp Colorado".

Bedrosian, Hoag, and their colleagues conducted two preliminary investigations to study the effect of message complexity on the communicative competence of AAC users (Bedrosian, et al., 1992; Hoag & Bedrosian, 1992). They investigated two levels of linguistic complexity, single words versus short phrases of two to four lexical items. Bedrosian, et al. (1992) had two groups of observers in their study, speech language pathologists with experience in AAC and adults with no prior experience in AAC. Results of their study suggested that message length did not seem to impact the perceptions of communicative competence of the AAC user according to the adults with no prior experience in AAC; however, the speech language pathologists with experience in AAC judged the AAC user to be a more competent communicator when he communicated via short phrases than when he used single words. A follow up study by Hoag and Bedrosian (1992) also investigated the effect of message length on perceptions of communicative competence. In this study, Hoag and Bedrosian used a larger group of adults with no prior experience in AAC and found that they rated the AAC user as a more competent communicator when he used short phrases than when he used single word messages. The follow up study had more power than the initial study by Bedrosian, et al. (1992), thus providing a potential explanation for the differences in the results.

To date, no research has investigated the effect of grammatically complete versus telegraphic messages on the communicative competence of AAC users. The studies by Bedrosian, Hoag, and colleagues considered the impact of short telegraphic phrases versus single words, but did not consider the impact of grammatically complete messages. Grammatical completeness is the norm within society and may be expected of AAC users, especially by people with no prior experience in AAC. Negative impressions may be formed about individuals who follow communication rules that differ from what is expected (Mathinos, 1988). However, the use of grammatically complete messages by individuals who use AAC does have a "cost"; rates of communication will be slower when grammatically complete messages are used than when telegraphic messages are used. Rates of communication can be enhanced through the use of telegraphic messages that include the salient content words, but omit the syntactic and stylistic elements that are secondary to the main content of the message (Yoder & Kraat, 1983). Results of Investigation #3 into the effect of nonobligatory turns suggests that rate of communication may

be an important factor to consider in interaction with other skills. At present, it is unclear whether the use of grammatically complete messages contributes positively to the communicative competence of AAC users and whether the effects of grammatical completeness are consistent across AAC users with different rates of communication. The earlier studies by Bedrosian, Hoag, and colleagues employed a nondisabled actor to portray the "AAC user". Results may not be generalizable to actual AAC users who communicate at much slower rates.

Therefore, the specific research questions for Investigation #4 were as follows:

1. What is the effect of grammatically complete versus telegraphic messages on the communicative competence of individuals who use AAC as perceived by professionals with experience in AAC (Study #4.1)?
2. What is the effect of grammatically complete versus telegraphic messages on the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC (Study #4.2)?
3. What is the effect of grammatically complete versus telegraphic messages on the communicative competence of individuals who use AAC as perceived by adolescents with no prior experience in AAC (Study #4.3)?

Subjects for Investigation #4

Study #4.1 involved 26 professionals with experience in AAC. Ages for the professionals ranged from 21-57 years (mean = 38 years). The group included 5 males (19%) and 21 females (81%). The majority of the professionals had a graduate degree (62%). Thirty eight percent had 1-5 years of experience in AAC; 50% had 6-10 years; and, 12% had more than 10 years of experience. Twenty three percent had worked with 5-24 individuals who used AAC during their professional careers; 46% had worked with 25-50 individuals; and, 31% had worked with more than 50 individuals who used AAC.

Study #4.2 involved 30 adults, none of whom had prior experience or training in AAC. The adults ranged in age from 20-72 years (mean=37 years); 43% were female and 57% were male. The adults represented a range of educational backgrounds, from less than high school to a Masters degree.

Study #4.3 involved 30 adolescents, none of whom had prior experience or training in AAC. The adolescents ranged in age from 12-18 years old (mean=15;2 years); educational levels ranged from grade 8-12. Forty seven percent were female and 53% were male.

Materials for Investigation #4

The female AAC user (H) was videotaped interacting in three different contexts: talking to her teacher about her plans for the summer; talking to two friends about the weekend; and, asking for directions. The male AAC user (D) was videotaped interacting in three different contexts: talking to his mother about inviting a friend over; talking to a computer consultant about problems with his computer; and, participating in a small group activity in a science class. The interactions involved both adults and peers, familiar and unfamiliar, in various situations at home, at school, and in the community. In one set of videotapes, the AAC users used grammatically complete messages, that is, they included all of the content words and functors required in the conversational context. In the other set of videotapes, the AAC users used telegraphic messages, that is, they included only the salient content words in their messages. The rate of communication was obviously slower for both of the AAC users in the grammatically complete condition than in the telegraphic condition since they had to select more words to communicate a grammatically complete message than a telegraphic one. In all other respects, the videotapes were the same.

Results for Investigation #4

Study #4.1 Professionals with experience in AAC. Tables 19 and 20 present the scores on the Communicative Competence Scale for the female and male AAC users respectively in the 'grammatically complete' condition and in the 'telegraphic' condition. The mean score for the female AAC user in the 'grammatically complete' condition was 86.5, while the mean score in the 'telegraphic' condition was 85.7. The mean score for the male AAC user was 103.2 in the 'grammatically complete' condition and 97.2 in the 'telegraphic' condition. The ANOVA results showed a statistically significant interaction between skill condition and AAC user ($F=5.96$; $df=1,25$; $p<.05$), indicating that the effect of grammatical completeness was not consistent across the two AAC users. Planned comparisons were conducted to determine the simple effect of grammatical completeness for the female and male AAC users separately. For H, the simple effect of the skill condition was not statistically significant; however, for D, the simple effect of the skill condition was statistically significant ($F=23.7$; $df=1,25$; $p<.05$). These results indicate that using grammatically complete messages positively impacts the communicative competence of AAC users as perceived by professionals with experience in AAC, but only for some AAC users; for other AAC users, the use of grammatically complete messages in face to face interactions may have no impact on their communicative competence.

Table 19.

Scores on the Communicative Competence Scale from the Professionals With Experience in AAC for the Female AAC User: With Grammatically Complete and Telegraphic Messages.

Subject	Grammatically Complete	Telegraphic Messages
1	77	72
2	72	65
3	84	59
4	84	88
5	100	85
6	101	85
7	76	70
8	73	69
9	52	54
10	70	87
11	67	73
12	86	92
13	80	76
14	82	95
15	97	99
16	86	99
17	103	109
18	100	96
19	96	98
20	86	94
21	92	96
22	90	88
23	97	89
24	90	85
25	104	101
26	105	104
Mean	86.5	85.7
SD	13.3	14.4

Table 20

Scores on the Communicative Competence Scale from the Professionals With Experience in AAC for the Male AAC User: With Grammatically Complete and Telegraphic Messages.

Subject	Grammatically Complete	Telegraphic Messages
1	104	111
2	100	91
3	117	105
4	87	84
5	122	113
6	119	111
7	96	87
8	88	73
9	98	92
10	102	95
11	97	78
12	97	94
13	98	99
14	125	119
15	100	94
16	107	95
17	114	104
18	119	103
19	99	96
20	93	98
21	94	90
22	92	86
23	97	99
24	99	102
25	112	107
26	106	100
Mean	103.2	97.2
SD	10.6	10.7

These results were confirmed by the forced choice data. For the female AAC user (H), 61% of the professionals indicated that there was no difference between the two videotapes; 31% indicated that H was a more competent communicator when she used grammatically complete messages; and 8% indicated that she was a more competent communicator when she used telegraphic messages. In contrast, 61% of the professionals indicated that D (the male AAC user) was a more competent communicator when he used grammatically complete messages; only 12% felt that he was more competent when he used telegraphic messages; and, 27% reported that there was no difference between the two conditions (χ^2 =10.2, df=2, p<.05).

Study #4.2 Adults with no prior experience in AAC. Tables 21 and 22 present the scores on the Communicative Competence Scale from the adults with no prior experience in AAC for the female and male AAC users respectively. The mean score for the female AAC user was 87.9 in the 'grammatically complete' condition and 82.6 in the 'telegraphic' condition. The mean score for the male AAC user in the condition with grammatically complete messages was 95.8 compared to a mean score of 89.6 in the condition with telegraphic messages. The ANOVA revealed a statistically significant main effect for skill condition (grammatically complete versus telegraphic messages) (F=9.02; df=1, 29; p<.05); the interaction between skill condition and AAC user was not statistically significant, suggesting that, for this group of observers, the effect of the skill condition was consistent across the two AAC users. These results from the forced choice data confirmed the results from the analysis of the scores on the Communicative Competence Scale in the case of the male AAC user. In this case, the majority of the adults (73%) indicated that D was a more competent communicator when he used grammatically complete messages; 13% thought he was more competent in the 'telegraphic' condition; while 13% indicated that there was no difference between the two videos with respect to D's communicative competence (χ^2=21.6, df=2, p<.05). In the case of the female AAC user, however, the forced choice data did not confirm the results of the Communicative Competence Scale. The majority of the adults (67%) indicated that there was no difference between the two videos in terms of H's communicative competence; 30% selected the 'grammatically complete' video as the one in which H was a more competent communicator; only 3% chose the 'telegraphic' video.

Table 21

Scores on the Communicative Competence Scale from Adults With No Experience in AAC for the Female AAC User: With Grammatically Complete and Telegraphic Messages.

Subject	Grammatically Complete	Telegraphic Messages
1	99	98
2	86	90
3	93	96
4	81	71
5	68	49
6	91	90
7	94	91
8	90	88
9	84	63
10	93	96
11	119	96
12	49	77
13	100	76
14	92	80
15	100	72
16	59	54
17	107	99
18	92	98
19	77	73
20	67	59
21	91	80
22	115	104
23	92	88
24	98	91
25	116	111
26	76	73
27	77	80
28	70	64
29	77	88
30	85	83
Mean	87.9	82.6
SD	16.2	15.1

Table 22

Scores on the Communicative Competence Scale from the Adults With No Experience in AAC for the Male AAC User: With Grammatically Complete and Telegraphic Messages.

Subject	Grammatically Complete	Telegraphic Messages
1	98	96
2	105	94
3	80	64
4	99	89
5	110	84
6	83	81
7	101	97
8	82	94
9	109	65
10	78	94
11	107	114
12	74	74
13	84	74
14	99	88
15	100	68
16	57	60
17	105	99
18	105	85
19	89	95
20	93	68
21	94	94
22	105	97
23	109	104
24	89	103
25	125	121
26	103	101
27	87	89
28	113	97
29	85	91
30	106	109
Mean	95.8	89.6
SD	14.1	15.0

Study #4.3 Adolescents with no prior experience in AAC. Tables 23 and 24 present the scores on the Communicative Competence Scale from the adolescents with no prior experience in AAC for the female and male AAC users respectively. The mean scores for the female AAC user in the 'grammatically complete' and 'telegraphic' conditions were 96.7 and 95.4 respectively; the mean scores for the male AAC user in the 'grammatically complete' and 'telegraphic' conditions were 107.5 and 99.2 respectively. According to the ANOVA, the interaction between skill condition and AAC user was statistically significant ($F=6.47$; $df=1,29$; $p<.05$), indicating that the effect of grammatical completeness was not consistent across the AAC users for this group of observers. Planned comparisons of the simple effect of the skill condition were conducted for each of the AAC users separately. For H, the female AAC user, the results were not statistically significant; use of grammatically complete messages did not positively influence the communicative competence of the female AAC user as perceived by the adolescents with no prior experience in AAC. Results from the forced choice question confirmed the results on the Communicative Competence Scale for the female AAC user (H). The chi square analysis of these data was not statistically significant: 47% of the adolescents indicated that H was a more competent communicator in the video where she use grammatically complete messages; 16% indicated that she was more competent in the video where she used telegraphic messages; 37% of the adolescents reported that there was no difference in H's communicative competence in the two videos.

In D's case, the analysis of the simple effect of skill condition revealed a statistically significant main effect ($F=12.11$; $df=1,29$; $p<.05$), indicating that the use of grammatically complete messages impacted D's communicative competence positively, according to the adolescents with no prior experience in AAC. The forced choice data confirmed the results of the Communicative Competence Scale. The chi square analysis was statistically significant ($\chi^2=38.4$, $df=2$, $p<.05$): 87% of the adolescents indicated that D was a more competent communicator in the video where he used grammatically complete messages; only 7% selected the video in which he used telegraphic messages; and, 7% indicated that there was no difference between the two videotapes.

Table 23

Scores on the Communicative Competence Scale from the Adolescents With No Experience in AAC for the Female AAC User: With Grammatically Complete and Telegraphic Messages.

Subject	Grammatically Complete	Telegraphic Messages
1	101	92
2	97	93
3	118	118
4	92	95
5	95	95
6	104	120
7	113	108
8	117	122
9	90	93
10	93	93
11	86	92
12	78	86
13	100	105
14	106	99
15	85	73
16	103	90
17	108	90
18	84	87
19	85	89
20	90	87
21	86	89
22	113	103
23	84	83
24	84	88
25	108	110
26	83	82
27	89	87
28	104	85
29	105	101
30	100	108
Mean	96.7	95.4
SD	11.3	11.8

Table 24

Scores on the Communicative Competence Scale from Adolescents With No Experience in AAC for the Male AAC User: With Grammatically Complete and Telegraphic Messages.

Subject	Grammatically Complete	Telegraphic Messages
1	117	100
2	108	96
3	123	117
4	120	124
5	114	93
6	114	92
7	124	96
8	120	101
9	120	115
10	100	61
11	110	98
12	107	74
13	98	92
14	124	123
15	122	108
16	105	105
17	108	105
18	88	93
19	96	89
20	112	104
21	116	109
22	108	112
23	92	98
24	87	88
25	104	116
26	84	85
27	92	94
28	102	76
29	108	97
30	101	115
Mean	107.5	99.2
SD	11.7	14.4

Discussion for Investigation #4

Results for Investigation #4 were not consistent across the two AAC users for the professionals with experience in AAC and the adolescents with no prior experience in AAC, suggesting that skills that contribute to communicative competence may not always be generalizable across AAC users. According to all three groups of observers (i.e., the professionals with experience in AAC, and the adults and adolescents with no prior experience in AAC), the use of grammatically complete messages contributed positively to the communicative competence of the male AAC user based on the scores from the Communicative Competence Scale and the forced choice data. According to the professionals with experience in AAC and the adolescents with no prior experience in AAC, the use of grammatically complete messages did not impact the communicative competence of the female AAC user: the scores on the Communicative Competence Scale were similar for the 'grammatically complete' and 'telegraphic' conditions; the forced choice data did not reveal a clear preference for the grammatically complete condition or for the telegraphic condition. For the adults with no prior experience in AAC, the scores on the Communicative Competence Scale for the female AAC user suggested that grammatically complete messages contributed positively to perceptions of the communicative competence of the female AAC user; however, the forced choice data indicated that the majority of the adults (67%) reported no difference in H's communicative competence between the two conditions (grammatically complete or telegraphic messages).

The differences between the male and female AAC users may reflect the interplay of user characteristics with the skill of grammatical completeness. As in the previous investigation on the use of nonobligatory turns, rate of communication may have interacted with grammatical completeness to determine its effect on the observers' perceptions of communicative competence. The male AAC user used direct selection and communicated at an efficient rate; his mean rate of turn transfers in the telegraphic condition was approximately 6-7 seconds, compared to 10 seconds in the grammatically complete condition. In contrast, the mean turn transfer time for the female AAC user was approximately 45 seconds in the telegraphic condition and 75 seconds in the grammatically complete condition. Gender may have also interacted in some way to effect the impact of grammatical completeness on the observers' perceptions of communicative competence; however, the explanatory comments provided by the observers at the end of the investigation suggested that rate was the variable of interest, not gender. In this study, age difference was not a potential explanation for the differential impact of grammatical completeness, since H and D were similar ages. Future research is required to empirically establish the interaction between rate of

communication and grammatical completeness of messages.

The data suggest that use of grammatically complete messages is a desirable goal in face to face interactions for individuals who use AAC and who communicate at efficient rates, at least in interactions with people who are unfamiliar. Use of grammatically complete messages may not be necessary with close friends and family who have a significant history interacting with the individual who uses AAC. Future research should address the effect of grammatically complete messages from the perspectives of consumers themselves and the significant others in their lives. The perceptions of these groups may or may not be similar to those studied in the present investigation.

For the female AAC user, use of grammatically complete messages did not impact positively on her communicative competence for the professionals and the adolescents; however, the use of grammatically complete messages did not detract from her competence either according to these two groups. Preference for the use of telegraphic messages was not clearly established either. It seemed that the positive impact of using grammatically complete messages was neutralized by the added time required to produce these messages. There was some evidence from Study #4.2 that adults without experience in AAC valued grammatically complete messages from AAC users even if they were slower communicators. The scores on the Communicative Competence Scale indicated a positive impact for grammatically complete messages, despite the added time required to produce these messages. The expectation for grammatically correct messages may be firmly ingrained in adults who are accustomed to communication via natural speech (Mathinos, 1988). Use of grammatically complete messages may be valued by this group despite the "cost" in terms of rate of communication. Future research with this group of observers is required to further investigate the impact of grammatically complete messages for AAC users with slower rates of communication.

It should be noted that it may be important to target grammatical completeness as a goal in instruction with AAC users, even if it is determined clearly that the use of grammatically complete messages in face to face interactions does not positively impact the communicative competence of some AAC users. While grammatical completeness may not be required to establish competence for all AAC users in face to face interactions, it may be required in written communication to establish competence. Grammatical completeness strongly influences judgements of competence in writing and may be required of individuals who use AAC in written output in educational and vocational settings.

Investigation #5: Use of Nonverbal Feedback

This section presents specific information about the research questions, independent variable, subjects, and materials for Investigation #5 into the effect of nonverbal feedback (Light, Ahmon, Moulton, & Seich, 1996). This specific information supplements the general information provided on the methodology of all five investigations earlier in the report. Results are presented for each of the three studies under Investigation #5; these results are discussed with implications for educational and clinical practice, and for future research.

Research Questions for Investigation #5

The independent variable of interest in Investigation #5 was the use of nonverbal feedback by students who use AAC. For the purpose of this investigation, nonverbal feedback was defined as eye gaze, facial expressions, head movements, and body posture used to provide listener feedback (Higginbotham & Yoder, 1982). Higginbotham and Yoder (1982) argued that nonverbal feedback is a necessary skill for AAC users. Nonverbal feedback conveys interpersonal attitudes, expresses emotional states, presents information about the speaker's personality and status, and manages attention and conversational feedback (Higginbotham & Yoder, 1982). Impairments in the use of relevant nonverbal signals may "significantly impede conversational interaction" (Higginbotham & Yoder, 1982; p.1).

Although Higginbotham and Yoder (1982) argued the importance of nonverbal feedback for AAC users, to date minimal attention has been directed toward this skill in intervention. To date, no research has investigated the effect of nonverbal feedback on the communicative competence of AAC users. Therefore, the specific research questions for Investigation #5 were as follows:

1. What is the effect of the use of nonverbal feedback on the communicative competence of individuals who use AAC as perceived by professionals with experience in AAC (Study #5.1)?
2. What is the effect of the use of nonverbal feedback on the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC (Study #5.2)?
3. What is the effect of the use of nonverbal feedback on the communicative competence of individuals who use AAC as perceived by adolescents with no prior experience in AAC (Study #5.3)?

Subjects for Investigation #5

Study #5.1 involved 20 professionals with experience in AAC. Ages for the professionals ranged from 25-49 years (mean = 34 years). The group included 3 males (15%) and 17 females (85%). The majority of the professionals had a graduate degree (90%). The majority (60%) had 1-5 years of experience in AAC; 30% had 6-10 years; and, 10% had more than 10 years of experience. Eighty five percent had worked with 5-24 individuals who used AAC during their professional careers; 10% had worked with 25-50 individuals; and, 5% had worked with more than 50 individuals who used AAC.

Study #5.2 involved 30 adults, none of whom had prior experience or training in AAC. The adults ranged in age from 18-74 years (mean=36 years); 57% were female and 43% were male. The adults represented a range of educational backgrounds, from less than high school to a college degree.

Study #5.3 involved 30 adolescents, none of whom had prior experience or training in AAC. The adolescents ranged in age from 14-17 years old (mean=15;8 years); educational levels ranged from grade 9-12. Fifty seven percent were female and 43% were male.

Materials for Investigation #5

The female AAC user (H) was videotaped interacting in four different contexts: discussing math homework with friends in the hall at school; talking to two friends about a school dance; talking about a school play with a friend's mother; and, getting cabin assignments on the first day of camp. The male AAC user (D) was videotaped interacting in three different contexts: talking to his mother about inviting a friend over; talking to a computer consultant about problems with his computer; and participating in a small group activity in a science class. The interactions involved both adults and peers, familiar and unfamiliar, in various situations at home, at school, and in the community. In one set of videotapes, the AAC users provided nonverbal feedback (the 'with skill' condition). In the other set of videotapes, the AAC users did not provide nonverbal feedback (the 'without skill' condition). In all other respects, the videotapes were the same.

Results for Investigation #5

Study #5.1 Professionals with experience in AAC. Tables 25 and 26 present the scores on the Communicative Competence Scale for the female and male AAC users respectively in the 'with nonverbal feedback' condition and in the 'without nonverbal feedback' condition. The mean score for the female AAC user in the 'with skill' condition was 109.8, while the mean score in the 'without skill' condition was 106.7. The mean score for the male AAC user was 104.8 in the 'with skill' condition and 100.3 in the 'without skill' condition. The ANOVA results indicated that neither the main effect for skill condition nor the interaction between skill condition and AAC user was statistically significant. However, the results of the chi square analyses of the forced choice data were statistically significant. For the female AAC user (H), 70% of the professionals indicated that H was a more competent communicator when she used nonverbal feedback; only 5% indicated that she was a more competent communicator when she did not use nonverbal feedback; and, 25% indicated that there was no difference between the two videos (χ^2=13.3, df=2, p<.05). Similarly, for the male AAC user, 60% of the professionals indicated that D was a more competent communicator when he used nonverbal feedback; none indicated that he was more competent when he did not use nonverbal feedback; and, the remaining 40% indicated that there was no difference between the two videos (χ^2 =11.2, df=2, p<.05).

Study #5.2 Adults with no prior experience in AAC. Tables 27 and 28 present the scores on the Communicative Competence Scale from the adults with no prior experience in AAC for the female and male AAC users respectively. The mean score for the female AAC user was 106.8 in the 'nonverbal feedback' condition and 102.9 in the 'without nonverbal feedback' condition. The mean score for the male AAC user in the condition with nonverbal feedback was 99.0 compared to a mean score of 96.2 in the condition without nonverbal feedback. The ANOVA revealed a statistically significant main effect for the skill condition (F=5.55; df=1, 29; p<.05); the interaction between skill condition and AAC user was not statistically significant, suggesting that the effect of the skill condition was consistent across the two AAC users. These results were not supported by the forced choice data, however. In H's case, the majority of the adults (57%) indicated that there was no difference in the two videotapes; 40% indicated that she was a more competent communicator in the video where she used nonverbal feedback, while only 3% selected the 'without skill' video as the one in which H was a more competent communicator. In D's case, the majority of the adults (53%) also indicated that there was no difference between the two videos in terms of D's communicative competence; 37% selected the 'with skill' video as the one in which D was a more competent communicator; only 10% chose the 'without skill' video.

Table 25

Scores on the Communicative Competence Scale from Professionals With Experience in AAC for the Female AAC User: With and Without Nonverbal Feedback.

Subject	With Nonverbal Feedback	Without Nonverbal Feedback
1	122	95
2	123	118
3	117	125
4	125	125
5	121	119
6	112	78
7	124	105
8	79	85
9	116	98
10	118	123
11	95	95
12	98	104
13	90	109
14	108	104
15	102	99
16	100	106
17	99	99
18	100	104
19	124	120
20	124	123
Mean	109.8	106.7
SD	13.6	13.5

Table 26

Scores on the Communicative Competence Scale from Professionals with Experience in AAC for the Male AAC User: With and Without Nonverbal Feedback.

Subject	With Nonverbal Feedback	Without Nonverbal Feedback
1	113	80
2	113	107
3	102	99
4	93	92
5	97	85
6	123	115
7	111	96
8	104	108
9	102	99
10	117	95
11	93	99
12	100	99
13	88	96
14	96	100
15	95	94
16	116	111
17	91	104
18	97	100
19	122	104
20	123	122
Mean	104.8	100.3
SD	11.5	9.6

Table 27

Scores on the Communicative Competence Scale from the Adults With No Experience in AAC for the Female AAC User: With and Without Nonverbal Feedback.

Subject	With Nonverbal Feedback	Without Nonverbal Feedback
1	119	81
2	93	78
3	96	85
4	107	91
5	116	97
6	125	125
7	96	98
8	117	120
9	95	93
10	122	108
11	82	93
12	121	117
13	124	125
14	125	120
15	95	95
16	95	94
17	79	81
18	92	95
19	125	120
20	96	94
21	95	93
22	124	125
23	122	121
24	109	104
25	109	117
26	99	94
27	98	103
28	121	115
29	100	106
30	106	100
Mean	106.8	102.9
SD	14.0	14.4

Table 28

Scores on the Communicative Competence Scale from the Adults With No Experience in AAC for the Male AAC User: With and Without Nonverbal Feedback.

Subject	With Nonverbal Feedback	Without Nonverbal Feedback
1	108	82
2	92	82
3	76	72
4	86	84
5	87	108
6	125	110
7	86	95
8	94	98
9	89	81
10	113	100
11	87	88
12	117	115
13	105	117
14	118	118
15	96	91
16	96	97
17	72	71
18	91	92
19	122	118
20	81	78
21	92	92
22	118	117
23	94	87
24	111	108
25	108	100
26	99	90
27	93	95
28	110	108
29	95	93
30	110	98
Mean	99.0	96.2
SD	13.9	13.7

Study #5.3 Adolescents with no prior experience in AAC. Tables 29 and 30 present the scores on the Communicative Competence Scale from the adolescents with no prior experience in AAC for the female and male AAC users respectively. The mean scores for the female AAC user in the 'with skill' and 'without skill' conditions were 100.0 and 100.4 respectively; the mean scores for the male AAC user in the 'nonverbal feedback' and 'without nonverbal feedback' conditions were 97.1 and 94.9 respectively. According to the ANOVA, neither the main effect for skill condition nor the interaction between skill condition and AAC user was statistically significant, indicating that the use of nonverbal feedback did not impact on the communicative competence of the AAC users according to the adolescents with no prior experience in AAC. Results from the forced choice question confirmed the results on the Communicative Competence Scale for both AAC users. For the female AAC user (H), 67% of the adolescents indicated that there was no difference between the two videos in terms of her communicative competence; 33% indicated that H was a more competent communicator in the video where she used nonverbal feedback; no one indicated that she was more competent in the video where she did not use nonverbal feedback. In D's case, 47% of the adolescents indicated that there was no difference between the two videos in terms of D's competence; 40% indicated that D was a more competent communicator in the video where he used nonverbal feedback; and, only 13% selected the video in which he did not use nonverbal feedback.

Discussion for Investigation #5

Results for Investigation #5 were consistent across the two AAC users. However, the pattern of results was not consistent across the observer groups, suggesting that the impact of nonverbal feedback on communicative competence may depend on who is the judge. For the adolescents with no prior experience in AAC, nonverbal feedback did not impact positively their perceptions of the communicative competence of the AAC users. For the adults with no prior experience in AAC and the professionals with experience in AAC, there was some evidence that nonverbal feedback may contribute positively to perceptions of the communicative competence of AAC users, but this evidence was not clear cut. Results of the three studies may have been affected by the use of videotaped interactions. It was difficult to capture the subtleties of nonverbal feedback (e.g., eye gaze patterns, facial expressions) on videotape. Results of the studies may have differed if observers had viewed live interactions or if they had participated in live interactions with the individuals using AAC. Future research should investigate the impact of nonverbal feedback using other methodologies.

Table 29

Scores on the Communicative Competence Scale from Adolescents With No Experience in AAC for the Female AAC User: With and Without Nonverbal Feedback.

Subject	With Nonverbal Feedback	Without Nonverbal Feedback
1	96	93
2	102	106
3	102	93
4	101	100
5	107	116
6	111	115
7	120	119
8	121	124
9	87	93
10	104	108
11	122	119
12	112	110
13	87	84
14	96	93
15	94	89
16	93	100
17	102	91
18	101	109
19	100	100
20	88	91
21	86	86
22	81	77
23	89	95
24	99	99
25	84	90
26	95	90
27	97	91
28	95	99
29	112	113
30	115	118
Mean	100.0	100.4
SD	11.2	12.2

Table 30

Scores on the Communicative Competence Scale from the Adolescents With No Experience in AAC for the Male AAC User: With and Without Nonverbal Feedback.

Subject	With Nonverbal Feedback	Without Nonverbal Feedback
1	67	67
2	105	102
3	108	90
4	94	91
5	115	116
6	95	92
7	119	122
8	124	106
9	88	76
10	106	94
11	117	117
12	109	106
13	106	100
14	106	93
15	109	93
16	93	93
17	102	92
18	98	104
19	79	87
20	84	86
21	81	96
22	84	81
23	81	93
24	96	95
25	79	79
26	77	85
27	93	85
28	92	100
29	104	101
30	103	104
Mean	97.1	94.9
SD	14.0	12.0

Summary of the Results of the Investigations Under Objective #1

The results and the educational/clinical implications of the five investigations under Objective #1 can be summarized as follows:

1. Use of an introduction strategy was found to contribute positively to the communicative competence of both of the AAC users according to all three observer groups (professionals with experience in AAC, adults with no prior experience in AAC, and adolescents with no prior experience in AAC). This skill should be targeted in intervention with AAC users to increase their communicative competence.
2. Use of partner-focused questions contributed positively to the communicative competence of both AAC users, according to the perceptions of the professionals. Results for the adults with no prior experience were equivocal, but these results suggested that partner-focused questions may impact positively on the communicative competence of AAC users, according to this group of observers as well. Future research is required to confirm this hypothesis. Results indicated that the use of partner-focused questions did not impact the adolescents' perceptions of communicative competence for either of the AAC users. These results suggested that the use of partner-focused questions may be an important goal to target for AAC users in their interactions with adults; this skill may not be required in interactions with children or adolescents.
3. The pattern of results in Investigation #3 was not consistent across the two AAC users. The results indicated that the use of nonobligatory turns contributed positively to the communicative competence of the male AAC user (who had a faster rate of communication), according to both groups of adults (with and without experience in AAC). The use of nonobligatory turns did not impact the adults' perceptions of the communicative competence of the female AAC user, who had a slower rate of communication. Rate seemed to interact with the use of nonobligatory turns. Results for the adolescents with no prior experience in AAC were equivocal, but these results suggested a similar pattern of results to those from the two adult groups. These results suggested that the use of minimal nonobligatory turns should be targeted as a goal for individuals who use AAC and who have efficient rates of communication, at least in their interactions with adults. Use of nonobligatory turns may not be an appropriate goal for those AAC users with slower rates of communication. Future research is required to confirm the interaction between the use of nonobligatory turns and rate of communication.

4. Results of Investigation #4 indicated that the use of grammatically complete messages impacted positively on the communicative competence of the male AAC user (who had a faster rate of communication), according to all three groups of observers. The use of grammatically complete messages did not impact the communicative competence of the female AAC user (who communicated at a slower rate), according to the perceptions of the professionals and the adolescents. Results from the adults with no prior experience in AAC were equivocal, but suggested that the use of grammatically complete messages may impact the perceptions of this group positively, even if the individual using AAC communicates at a slow rate. Use of grammatically complete messages in face to face interactions should be targeted as a goal for intervention with individuals who use AAC and who have efficient rates of communication, especially in their interactions with unfamiliar people. The development of grammatical skills may also be important for AAC users who communicate at slower rates, since the use of grammatically complete sentences will impact their written communication. However, use of grammatically complete messages may not be required for this group of AAC users in their face to face interactions with adolescents or professionals.
5. Results of Investigation #5 indicated that nonverbal feedback did not seem to impact the communicative competence of either AAC user, as judged by the adolescents with no prior experience in AAC. For the professionals with experience in AAC and the adults with no experience in AAC, results were equivocal, although they suggested that the use of nonverbal feedback may impact positively on the communicative competence of AAC users. Future research is required to investigate the impact of this skill further; other methodologies should be explored since the medium of videotape did not lend itself to clear representations of nonverbal feedback.

Limitations to the Investigations Under Objective #1

As with any research, there are some potential limitations to the five investigations that should be considered when interpreting the results. First, the subjects watched videotaped interactions of individuals using AAC, rather than interacting with the AAC users themselves. This methodology was used to control for the confounding variables (e.g., topic of conversation, length of conversation, etc) that would be present if each of the subjects had interacted directly

with the AAC users. However, there may be limits to the generality of the results. The judgements of the observers represent those that might be made by individuals who observe AAC users in interactions, but do not interact with the individuals directly. The judgements of the subjects might have changed if they had interacted with the AAC users directly. However, research by O'Keefe (1991) suggests otherwise. O'Keefe compared the attitudes about AAC users formed by individuals who interacted directly with individuals who used AAC, compared to those who observed these interactions live, and those who observed the interactions on videotape. O'Keefe's results suggested that the results of the investigations conducted under Objective #1 should be similar to those that would have been obtained, if the subjects had interacted directly with the AAC users.

A second potential limitation of the investigations was the use of scripted interactions. Scripts were used to maintain consistency in the interactions across the skill conditions, to ensure that only the target skill varied across the skill conditions, and to thus rule out the effect of potentially confounding variables. The scripted interactions were based on actual interactions by the participants in their daily lives to maximize ecological validity. However, the scripts may have detracted in some way from the naturalness of the interactions.

The investigations under Objective #1 included two AAC users. The use of two AAC users was a significant improvement over previous research that involved a single AAC user or used a nondisabled actor, pretending to be an AAC user. These previous studies assumed the generalizability of results across AAC users. Results of the present investigations suggest that assuming the generalizability of results across AAC users is a dangerous assumption. The impact of some of the skills investigated was not consistent across the two AAC users (i.e., use of nonobligatory turns, use of grammatically complete versus telegraphic messages). In three of the investigations, the results were consistent across the two AAC users. However, since only two AAC users were employed in these investigations, the generalizability of results across all AAC users can not clearly be established. Results in these investigations may have varied for other AAC users presenting with different personal characteristics.

The investigations considered only two levels of skill use: proficient use of the skill (the 'with skill' condition) or the absence of the skill (the 'without skill' condition). These two levels represent the extremes of the continuum. Many AAC users fall somewhere in between these extremes on the continuum of skill development. The present studies leave unresolved the question of how proficient an individual must be with a specific skill for it to impact positively on their overall communicative competence. For example, does the individuals need to take all of

his/her nonobligatory turns to be perceived as a more competent communicator (in the case of those AAC users with efficient rates of communication) or will the individual be perceived as more competent if he/she fulfills 50% of the opportunities for nonobligatory turns? Light (1989) argued that communicative competence required adequate levels of skill development, but not the full mastery of all communication skills.

The present studies investigated the perceptions of professionals with experience in AAC, adults with no prior experience in AAC, and adolescents with no prior experience in AAC. The studies did not address the perceptions of consumers who use AAC and the significant others in their lives. These perceptions are critical to a full understanding of the communicative competence of AAC users.

Directions for Future Research

There are a number of areas that require future research to advance our understanding of the skills that contribute to communicative competence for individuals who use AAC: investigations to identify other skills that contribute positively to the communicative competence of AAC users (see Appendix A for potential skills to be investigated); investigations of the interactions between various skills and the resulting impact on communicative competence, or of the interactions between the characteristics of AAC users and specific skills; and, investigations of the perceptions of consumers who use AAC and of the significant others in their lives. Future research is also required to develop, implement, and evaluate instructional programs to teach the skills identified as ones that contribute to communicative competence for AAC users. The three investigations under Objective #2 addressed this latter research issue for three skills: use of an introduction strategy, use of partner-focused questions, and use of nonobligatory turns by individuals who use AAC and who have efficient rates of communication.

OBJECTIVE #2

To conduct and report on 3 investigations to evaluate the efficacy of instructional techniques to promote the development of the skills identified, through Objective #1, as contributors to the communicative competence of students using AAC.

The purpose of this objective was to address the second of the problems described in the literature review: the lack of empirically-validated instructional techniques for fostering the development of the skills that underlie communicative competence. Three investigations were conducted, each focused on the acquisition, generalization, and maintenance of one of the linguistic, operational, social, or strategic behaviors identified as contributing to communicative competence through the investigations for Objective #1. Investigation #6 evaluated instruction in the use of an introduction strategy; Investigation #7, use of partner-focused questions; and, Investigation #8, use of nonobligatory turns by individuals with efficient rates of communication. Each of the 3 investigations employed a single subject multiple probe experimental design, replicated across 5-6 subjects, to investigate the effect of instruction on the acquisition, generalization, and maintenance of the skill targeted. Results of each investigation were socially validated, as recommended by Kazdin (1977), in order to ensure that the instruction did indeed improve the communicative competence of the participants and that its outcomes were valued by the participants and the significant others in their lives, as well as members of society generally.

The following sections present information on the general methods employed across all three of the investigations. The section on general methods is followed by sections on each of the three investigations specifically. The latter sections provide information on the specific research questions, subjects, procedures, and measures for each of the three investigations. Results of the investigations are presented and discussed with implications for educational and clinical practice, and for future research.

General Methodology for the Investigations under Objective #2

Research Questions

The following research questions were addressed by each of the 3 investigations under Objective #2:

1. Does the instruction result in the successful acquisition of the target linguistic, operational, social, or strategic skill by individuals who use AAC?

2. Does the instruction result in the generalization of the target linguistic, operational, social, or strategic skill by individuals who use AAC to naturally occurring interactions?
3. Does the instruction result in the maintenance of the target linguistic, operational, social, or strategic skill by individuals who use AAC at least two months after instruction ends?
4. Are the instruction and its resulting outcomes valued by the individuals who use AAC, and the significant others in their lives?
5. Do the instruction and its resulting outcomes enhance the communicative competence of individuals who use AAC as perceived by adults with no prior experience in AAC?

The specific linguistic, operational, social, and strategic behaviors to be targeted in each of the three investigations were determined as an outcome of the investigations under Objective #1 as described in the preceding section. The following skills were targeted for instruction: use of an introduction strategy (Investigation #6); use of partner-focused questions (Investigation #7); and use of nonobligatory turns to increase the frequency of participation by individuals using AAC who had efficient rates of communication (Investigation #8). These skills represent a diverse array of skills, including those that might be appropriate for children and youth at basic levels of communication (e.g., use of nonobligatory turns) and those that might be appropriate for individuals with more fully developed repertoires of skills (e.g., use of partner-focused questions).

Design

The three investigations each employed the same experimental design, a single subject multiple probe design replicated across subjects (Horner & Baer, 1978; McReynolds & Kearns, 1983; Kearns, 1986; Tawney & Gast, 1984). Five to six subjects were recruited for each of the investigations. Baselines were obtained for the target dependent behavior (i.e., use of an introduction strategy in Investigation #6; use of partner-focused questions in Investigation #7; and use of nonobligatory turns in Investigation #8) for each of the subjects in each of the investigations. Once stability was obtained for the target behavior in baseline, then instruction was instituted with subjects individually in a sequential manner. Instruction began with the first subject, while the remaining subjects remained in baseline. Once treatment effects were demonstrated with the first subject, then instruction was instituted with the next subject and so on until all subjects had received instruction. Experimental control was established by introducing the instruction (the independent variable) in a staggered manner across subjects (Horner & Baer, 1978). Threats to the validity of the investigation due to history, maturation, or testing effects were eliminated by the staggered introduction of instruction. All subjects were functionally

independent of each other; they participated in different educational programs and had no contact with each other over the course of the investigation. The effectiveness of the instructional program was evaluated by comparing the subjects' performances during baseline (pre-instruction) to their performances post-instruction.

Single subject designs are particularly well suited to evaluating the efficacy of instructional techniques with populations that are heterogeneous such as the AAC population, since subjects serve as their own controls (Higginbotham, 1990; McEwen & Karlan, 1990). In single subject experimental designs, the focus is on individuals and their behaviors. The performance of individuals is not obscured through the averaging of group results. The focus on individuals is especially critical in groups such as the AAC population, where individuals have diverse abilities, and varied educational, psychological, and medical histories. Furthermore, the focus on individuals and their performance is in synchrony with the philosophy of Individualized Educational Plans, mandated in the nation's educational system. Single subject experimental designs allow for evaluation not only of instructional outcomes, but also of the learning process since they involve repeated measurement over time during skill acquisition, rather than simply at two or three selected points in time. Understanding the learning process, as well as its outcomes, is critical to effective educational planning. Single subject experimental designs lend themselves to investigations of generalization and maintenance as well as acquisition of behaviors (Dattilo, 1989); issues of maintenance and generalization are critical to the efficacy of AAC interventions (Calculator, 1988).

The multiple probe design replicated across subjects is particularly well suited to answer questions regarding the efficacy of instruction relative to a no-treatment condition. This design allows for the control of threats of maturation, history, and testing, but does not require a reversal of treatment which is obviously undesirable in educational settings where important new skills are being acquired. The design is advantageous since it minimizes prolonged, continuous baseline measures. Generalizability of findings is established through direct replications across subjects (McReynolds & Kearns, 1983; Tawney & Gast, 1984). With five to six subjects with varied characteristics participating in each investigation, the generalizability of results was enhanced.

Subjects

For each of the three investigations, five to six subjects participated (Investigation #6, n=5; Investigation #7, n=6; Investigation #8, n=5). All subjects met the following selection criteria: (a) were functionally nonspeaking according to the definition of the American Speech

Language Hearing Association (1981), that is, speech inadequate to meet daily communication needs; (b) used AAC (e.g., a computer-based voice output system; a communication board of pictures, symbols, and/or traditional orthography; gestures; signs); (c) had hearing and vision (with correction, if required) within normal limits; (d) had IEP objectives or goals to promote communicative competence; (e) had consent from parents or guardians to participate in the investigations; and (f) had teachers, speech language pathologists, and other related personnel who were interested in participating in the study.

Given the dearth of research into the development of communicative competence to date, subjects for the 3 investigations included individuals representing a broad age range and various disabilities. The variation in subject characteristics in each investigation allowed exploration of the generality of the results. Although the AAC population includes people with severe sensory impairments concomitant with their speech impairment, the presence of a severe vision or hearing impairment impacts significantly on the communication process, posing challenges to both receiving and sending information. Therefore, the 3 investigations in this line of research did not include individuals with significant sensory impairments. The unique challenges of this group should be addressed in future investigations.

Subjects were recruited from the caseloads of local schools, speech and language clinics, and the Pennsylvania Assistive Technology Center (PA ATC), a nationally recognized program of the PA Bureau of Special Education that serves students who require assistive technology to meet their communication needs. Subjects identified as potential candidates for the investigations were screened to ensure that they met all selection criteria and to ensure the appropriateness of the target skills for intervention. Subjects were randomly selected for each investigation from the list of candidates who met the selection criteria. Specific demographic information about each of the subjects is reported in the sections that present the specific methods for each of the investigations.

Experimental Conditions

The investigations involved three experimental conditions: baseline prior to intervention; intervention consisting of the instruction in the target skill; and, generalization and maintenance probes after intervention. During baseline, observations were conducted of the subjects interacting with others during their daily routine in the natural environment. A minimum of three baseline observations were conducted for each subject until a stable baseline was established. Following baseline, intervention was initiated following the instructional procedures summarized below and described in detail in Appendix D (Instructional module to teach use of an introduction

strategy), Appendix E (Instructional module to teach partner-focused questions), and Appendix F (Instructional module to teach nonobligatory turns). Once subjects reached criterion for the target behavior within instructional sessions, then generalization probes were conducted within the participants' natural environments to ensure that the subjects had generalized the use of the target skill to other partners, settings, and tasks. Observations of the subjects interacting in the natural environment continued at regular intervals (i.e., 2 weeks, one month, two months) post intervention to ensure that the subjects maintained generalized use of the target skill after formal instruction ended.

Instructional Procedures

The independent variable in the 3 investigations was the instruction provided. The instructional goals and procedures were documented in instructional modules (see Objective #3 for a full description of the development of these modules). The instruction was based on the best information currently available about effective instruction for individuals who use AAC. The instruction incorporated the following "best practices" for AAC instruction in education settings, as recommended by Calculator and Jorgensen (1991): (a) instruction targeted functional outcomes that were clearly specified and were measurable; (b) instruction focused on naturally occurring interactions in which the individuals participate in their daily lives; (c) skills were taught in the context of meaningful interactions and activities, not in isolation; and (d) the efficacy of instruction was evaluated relative to performance in communication situations within the natural environment.

The specific instructional procedures incorporated principles of effective instruction identified by Rosenshine and Stevens (1986) and principles from instructional models that have been found to be effective in teaching a wide range of skills and strategies to students with learning disabilities (e.g., Deshler & Schumaker, 1988). These general instructional procedures were adapted and applied to teach new communication skills to individuals who use AAC.

A brief summary of the procedures used to teach the skills is provided below; further details of these instructional procedures are provided in the instructional modules which are included in Appendix D (introduction strategy), Appendix E (partner-focused questions), and Appendix F (nonobligatory turns). The following were the general instructional procedures implemented: (a) define the specific goal for the individual who uses AAC; (b) explain the target goal to the individual who uses AAC; explain why it is important to use this skill; (c) demonstrate how to use the target skill or have the individual who uses AAC observe another AAC user using

the skill; if appropriate, accompany the demonstration with think-aloud statements explaining when to use the target skill, how, and why; (d) ask the individual and/or significant others, as appropriate, to think of situations in which the individual should use the target skill; (e) set up situations for the individual to learn to use the target skill, either during actual interactions as they occur in the natural environment, or during a combination of role plays and actual interactions in the natural environment; (e) start instruction in situations that are less demanding; as the individual develops competencies, introduce more demanding situations; (f) provide guided practice for the individual in using the target skill in the naturally occurring situations and/or role plays; (g) always give the individual the opportunity to use the target skill spontaneously; prompt the individual only as required using the following "least to most" cuing hierarchy: natural cue (i.e., something that happens naturally that lets the individual know that it is time to use the target skill), expectant delay (i.e., look at the individual using AAC and wait for an extended period, maintaining eye contact with the individual who uses AAC with an expectant facial expression), point (i.e., point toward the individual or his/her AAC system(s) in a general manner, look at the individual expectantly, and wait for an extended period), and model (i.e., model the correct use of the target skill, then look at the individual using AAC, and wait expectantly for an extended period); (h) provide feedback to the individual who uses AAC following each instructional session, highlighting his/her appropriate use of the target skill and providing specific feedback about problem areas; (i) evaluate progress on a regular basis to ensure that the instruction is effective; (j) practice until the individual uses the target skill spontaneously, at criterion level (i.e, in 80% of the opportunities), during instructional sessions, on at least two consecutive occasions (Light & Binger, 1996a).

Instruction was implemented by on-site professionals (e.g., speech language pathologist, classroom teacher) responsible for providing services to the subjects, under the supervision of the researchers. On-site professionals were used to implement instruction in order to ensure that the instructional techniques were not only effective, but were also practical for implementation within the educational program and within various other models of intervention. The on-site professionals received copies of the instructional modules documenting the goals and instructional procedures prior to implementation of the studies (see Appendix D for Investigation #6, Appendix E for Investigation #7, and Appendix F for Investigation #8). They practiced implementing the instructional procedures prior to initiating instruction with the subjects. Supervised practice continued until the on-site professionals reached an agreement of 90% or greater with the instructional standard (as documented in the modules) in at least two consecutive instructional

sessions. Procedural reliability checks (Billingsley, White, & Munson, 1980; Peterson, Homer, & Wonderlich, 1982) were conducted on a regular basis throughout the 3 investigations to ensure that the instructional procedures were being implemented correctly. The checks were conducted on randomly selected sessions, representing at least 10% of the instructional sessions for each of the subjects. Percent of compliance with the planned instructional procedures was calculated as described by Billingsley, et al. (1982).

Measures

The dependent variables in the 3 investigations were the specific linguistic, operational, social, and strategic behaviors identified through the investigations in Objective #1 of this project as contributing to the communicative competence of students using AAC: use of an introduction strategy in Investigation #6; use of partner-focused questions in Investigation #7; use of nonobligatory turns in Investigation #8. Each of the target behaviors was operationally defined (see the sections on each investigation for these operational definitions). Data on the acquisition, maintenance, and generalization of the behaviors were collected by on-site professionals through direct observational recording procedures during baseline (pre-instruction), during instruction, and post-instruction.

All instructors collecting data on the project were trained until they met the defined standard with at least 90% accuracy. Periodic checks of the instructors' coding against the standard were made throughout the project to protect against the effect of "observer drift" on the data collected. In addition, inter-observer agreement checks for the dependent measures were conducted on randomly selected sessions during the baseline, instruction, and generalization and maintenance phases. Observational data collected by the on-site professionals were compared to data collected by the researchers. Inter-observer agreement percentages were calculated as follows: number of agreements divided by number of agreements plus disagreements, and then multiplied by 100. Acceptable levels of inter-observer agreement were set at 80% (Kazdin, 1982).

Data Analysis

Data were analyzed using the systematic visual inspection techniques recommended for single subject experimental designs (Tawney & Gast, 1984). Frequencies of the dependent behaviors, divided by the number of contexts in which the behavior was required, were tabulated for each observational session during the baseline, instruction (acquisition), and, generalization

and maintenance conditions. Data were summarized in graphic form and were visually inspected to determine: (a) the level and/or slope of data in the baseline, instruction, and, generalization and maintenance conditions; and (b) the change in the level and slope of data across the conditions.

Social Validation

In order to determine the social validity of the instructional program and its outcomes, two procedures were used. Questionnaires were completed by the participants and the significant others in their lives (e.g., parents, teachers), following procedures similar to those used by Light, Dattilo, English, Gutierrez, and Hartz (1992) and Peck, Killen, and Baumgart (1989). The intent of the questionnaires was to determine the meaningfulness and usefulness of the instruction and its outcomes, as judged by the participants and their significant others. As a second measure of social validity, 20 adults with no prior experience in AAC were asked to judge the communicative competence of the individuals using AAC, pre and post instruction. These observers were blind to the goals of the studies. Videotapes were collected of randomly selected sessions during the baseline and post-instruction conditions for each of the individuals using AAC. The two videotapes were presented to the observers in random order; the observers were blind as to the status of the videotapes (i.e., baseline or post-instruction). After viewing the videotapes, the observers were asked a forced choice question to determine whether the individual using AAC was a more competent communicator in the first or second video observed, or if there was no difference between the two videos. Data from the forced choice questions were summarized and analyzed separately for each of the participants using chi square analyses.

If the linguistic, operational, social, and strategic skills taught are to be truly functional, then they must serve to enhance the communicative competence of the subjects and they must be valued by the participants, by the significant others in their lives including parents, teachers, and other professionals, and by society generally (Calculator, 1988; Kazdin, 1977). The use of two approaches to social validation permitted evaluation of the instruction and the resulting outcomes to ensure that they were truly functional and valued as judged by all stakeholders: the individuals who used AAC, their significant others, and society generally.

Investigation #6: Acquisition, Generalization, and Maintenance of an Introduction Strategy

This section presents specific information about the research questions, subjects, measures, and results for Investigation #6 into the acquisition, generalization, and maintenance of an introduction strategy by individuals who use AAC (Light & Binger, 1996b; Light, Binger, Dilg, & Livelsberger, 1996). This information supplements that presented above on the general methods employed in all three investigations under Objective #2.

Research Questions for Investigation #6

The results of Investigation #1 indicated that the use of an introduction strategy contributed positively to perceptions of communicative competence for AAC users across all three groups of observers. Based on these results, it is evident that use of an introduction strategy is an important goal for AAC users. Yet, to date, there has been no research to establish effective instructional programs to teach the use of an introduction strategy to individuals who use AAC. Therefore, Investigation #6 developed, implemented , and evaluated an instructional program to teach the use of an introduction strategy to AAC users. The specific research questions addressed in this investigation were:

1. Does the instruction result in the successful acquisition and spontaneous use of an introduction strategy by individuals who use AAC?
2. Does the instruction result in generalized use of an introduction strategy by individuals who use AAC to new partners, environments, and tasks in the natural environment?
3. Does the instruction result in maintenance of spontaneous use of an introduction strategy by individuals who use AAC after formal instruction ends?
4. Are the acquisition of an introduction strategy and its resulting outcomes valued by the individuals who use AAC, and the significant others in their lives?
5. Do the use of an introduction strategy and its resulting outcomes enhance the communicative competence of the individuals who use AAC as perceived by adults with no prior experience in AAC?

Subjects for Investigation #6

Five subjects participated in the investigation. A summary of demographic information on the subjects and their instructors is provided in Table 31.

Table 31

Demographic Information on the Subjects and Instructors in Investigation #6 (Use of an Introduction Strategy)

Subject	Age	Gender	Disability	AAC Systems	Instructor(s)
#1 JD	16	M	Cerebral palsy	Eye pointing; Liberator with IEP+ software	SLP and Teacher
#2 MAK	44	F	Cerebral palsy	Eye pointing; Light Talker with Language, Living, & Learning software	Residential counselor in consultation with SLP
#3 LP	12	F	Developmental delay	Some speech; gestures; Liberator with IEP+ software	SLP
#4 JH	28	M	Autism	Few spoken words; gestures; Epson with Realvoice	Graduate student in SLP supervised by a certified SLP
#5 JG	35	M	TBI	Speech; oral spelling; gestures; IBM compatible lap top with EZ Keys software and Multivoice synthesizer	Graduate student in SLP supervised by a certified SLP

Subject #1, JD, was a 16 year old male who had cerebral palsy. He had good head control, but had no functional use of his hands or legs. He was typically seated in a manual wheelchair and had no independent mobility. His hearing was reported to be within normal limits. He wore glasses; his corrected vision was reported to be within normal limits. He had severe oral motor involvement and was fed by a G-tube. He had no functional speech. He communicated by means of: eye pointing to people, objects, and activities within his environment; eye pointing to yes/no blocks on the arms of his wheelchair; facial expressions; and, a computer-based voice output system, a Liberator with Interaction, Education, and Play software. He controlled the Liberator via a head mounted infrared pointer. He primarily communicated by retrieving prestored messages from the Liberator; he did occasionally generate novel messages by retrieving single words from the IEP+ software. Formal language testing by school personnel at the time of the study indicated a significant delay in receptive language skills: JD scored at the 5;11 year level on the Receptive One Word Picture Vocabulary Test. JD typically occupied a respondent role in his interactions. His communication skills were functional with a limited range of familiar partners; he experienced significant difficulties with unfamiliar partners. JD lived in a group home and attended a life skills class in a rural school. There were frequent changes in the staff at JD's group home. Finding strategies to interact more effectively with new partners was a priority for JD. Instruction in an introduction strategy was provided for JD by school personnel, JD's special education teacher and his speech language pathologist (SLP). JD's teacher had a Masters degree in Special Education; she had worked as a teacher in a life skills classroom for 10 years. In her career, she had worked with 3 students who used AAC. JD's SLP had a Masters degree as well. She had worked as a speech and language pathologist in the schools for 27 years. During her career, she had worked with 4 students who used AAC. Neither JD's teacher nor his SLP had received preservice training in AAC, but both had attended two inservice workshops on assistive technology.

Subject #2, MAK, was a 44 year old female. She had severe spastic cerebral palsy. MAK had been institutionalized as a young child and had never attended an educational program; she had moved out of the institution into a group home when she was 36 years old. During the week, she attended a sheltered workshop for people with disabilities. MAK had no functional use of her hands or legs, but had good head control. She was typically seated in a manual wheelchair and had no independent mobility. Her hearing was within normal limits. She wore glasses; her corrected vision was within normal limits. She had a seizure disorder which was largely controlled through medication. She had four word approximations (i.e., yeah, no, bad, hey)

which were intelligible to familiar partners. She communicated by means of eye pointing, facial expressions, and gestures (i.e., head shake and head nod). She received her first AAC system at the age of 40, four years prior to the study. She used a Light Talker with Language, Living, and Learning software, controlled by a head-mounted optical pointer. Formal language testing revealed significant deficits in receptive language skills; her receptive language skills were found to be at the 5;5 year level according to the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981). MAK's receptive language skills were functional for basic conversation. She enjoyed interacting with others. She was highly motivated to find a community-based job, and was involved in an advocacy group for people with disabilities. She experienced difficulties in her interactions with unfamiliar people. Instruction in the use of an introduction strategy was considered a priority and was provided for MAK by one of the counselors in her group home, in consultation with a SLP. The residential counselor has an undergraduate degree in psychology. He had been working in the group home for approximately a year and a half and had worked with 5 individuals who used AAC. He had attended several inservice workshops in AAC.

Subject #3, LP, was a 12 year old female. She had a developmental delay with hypotonia and scoliosis. She had developmental apraxia; her speech was limited and was characterized by hyponasality and decreased respiratory support. She made numerous consonant substitutions and deletions. LP augmented her speech with gestures, a few signs, and the use of a computer-based voice output system, a Liberator with IEP+ software. She controlled the Liberator via direct selection with her right index finger. Formal language testing revealed a significant receptive language delay; she scored at the 4;2 year level on the Peabody Picture Vocabulary Test- Revised (Dunn & Dunn, 1981). LP attended a learning support class and was integrated for part of the day with her age level peers. She was able to read and spell approximately 25-50 words. LP's hearing was reported to be within normal limits; her corrected vision was also within normal limits. LP was able to walk independently, although she had difficulty with balance and coordination. Her Liberator was mounted on a walker which she took from class to class. Goals for LP included developing greater independence at school and in the broader community. One barrier to her independence was her difficulty interacting with unfamiliar partners. Therefore, learning to use an introduction strategy was considered to be a priority for LP. Instruction was provided for LP by the SLP at her school. Her SLP had a Masters degree in Communication Disorders. She had been working for 3 years and had worked with approximately 15-20 students who used AAC. She had completed a graduate course in AAC during her preservice program and had attended several continuing education workshops in assistive technology since graduation.

Subject #4, JH, was a 28 year old man with autism. JH had very good motor skills. His hearing and vision were within normal limits. JH lived at home with his parents in a rural community. He was employed in the family business as a motor technician. JH was able to follow simple one step and two step commands presented orally. He performed best when oral language was concrete and when it was augmented by gestures or written instructions. JH was able to read simple texts and write single words. He communicated via natural speech, using single words or two word telegraphic utterances. His speech was characterized by a very fast rate and by numerous repetitions of the same word (e.g, "up, up, scare, scare"). As a result, his speech was very difficult to understand, especially for unfamiliar partners. JH used an Epson with Realvoice to augment his speech; he spelled telegraphic messages out letter by letter or retrieved prestored messages via logical letter codes. He controlled the Epson via direct selection with the index finger of his right hand. JH frequently encountered new people through his job or in the local community. He experienced difficulty communicating with unfamiliar partners, who were often uncomfortable interacting with him. Learning to use an introduction strategy was considered a priority for JH to put new partners at ease in their interactions with him. Instruction for JH in the use of an introduction strategy was provided by a graduate student in speech language pathology under the supervision of a speech language pathologist through a university-based clinic. The model of intervention was community-based; instructional sessions were frequently conducted in JH's home, work, and community environments. The graduate student in SLP had worked for 3 years with approximately 25-50 individuals who used AAC. She had completed three graduate courses in AAC.

Subject #5, JG, was a 35 year old man who had experienced a severe head injury in a motor vehicle accident 15 years prior. His hearing was within normal limits. His vision was 20/50 in the left eye and 20/40 in the right eye; he had nystagmus in both eyes and had difficulty focusing on small print. JG had attention and short term memory problems due to his brain injury. He was typically seated in a manual wheelchair which he could propel independently with his hands and feet for short distances; he was able to transfer independently. He had functional use of both hands, but his motor responses were slow. He lived with his parents in a rural area. He was not employed and was not involved in a work training program. He used natural speech as his primary means of communication. He had a moderate to severe speech impairment secondary to the head injury. His intelligibility varied from 50%-80% depending on the topic, the familiarity of the partner, and JG's level of fatigue. JG used oral spelling to clarify his speech. He was learning how to use a computer-based voice output system to augment his natural speech as well. He used

an IBM compatible laptop with a Multivoice speech synthesizer and EZ keys software. He controlled the system via direct selection on the standard keyboard. He used a large font (22 point) to accommodate his visual impairment. He communicated novel messages by typing them out letter by letter, using the linguistic prediction feature on the EZ Keys software to accelerate his rate. He had frequently-used messages preprogrammed into his computer; he retrieved these messages using logical letter codes. JG identified his social isolation and his lack of employment as the two major problems in his life. He had difficulty initiating interactions with new partners who were often uncomfortable communicating with him. Learning to use an introduction strategy was considered a priority to facilitate these interactions. At the time of the research, JG was involved in a university-based intensive residential therapy program for individuals with severe communication disabilities. JG lived on campus and participated in daily instruction in communication skills in individual and small group sessions. The program was community-based and focused on functional communication skills required in daily living. Instruction in the use of an introduction strategy for JG was provided by a graduate student in communication disorders under the supervision of a SLP. The graduate student had been working for two years with approximately 50 individuals who used AAC. He had taken undergraduate and graduate courses in AAC and had attended several workshops and conferences on assistive technology. Instruction for JG was provided in community-based activities.

Instructional Procedures for Investigation #6

The specific instructional procedures implemented in Investigation #6 are documented in the instructional module in Appendix D. As noted earlier, each of the instructors was provided with a copy of the instructional module and trained to implement the instructional procedures. Procedural reliability was calculated for each of the instructors on randomly selected sessions, representing at least 15% of the sessions. The mean procedural reliability for the five instructors was 94.9% (ranging from 86.4% to 100%), indicating a high level of fidelity with the procedures documented in the instructional module.

Measures for Investigation #6

The dependent variable of interest in Investigation #6 was the use of an introduction strategy. For the purposes of this research, an introduction strategy was defined as a message used when meeting someone new. This message had at least two components: (a) it included information on how the AAC user communicated (e.g, shakes his head to say no, raises her eyes

to say yes, uses a computer with a speech synthesizer); and, (b) it explained what the partner needed to do to facilitate the interaction (e.g., wait while the AAC user produces her message, indicate if a message is not understood, etc.). The introduction strategy was typically used with a greeting; an attention getting phrase was also required in some situations. Each time that the AAC user encountered someone new was defined as an opportunity to use an introduction strategy. To be coded as spontaneous, the AAC user had to use the introduction strategy following natural cues at the first available opportunity to do so.

Interobserver reliability checks were conducted on randomly selected sessions representing at least 15% of the sessions during the baseline, instruction, and generalization and maintenance phases. The mean interobserver agreement (number of agreements divided by the number of agreements plus disagreements plus omissions) across the five subjects was 96.8% agreement (range of 87.5% to 100% agreement).

Results of Investigation #6

Figure 1 presents data on the spontaneous use of an introduction strategy by the five subjects when meeting someone new for each of the three phases of the study (baseline, instruction, and generalization and maintenance post-instruction). Comparisons of the five subjects' performances at baseline with those during the maintenance phase post-intervention provide clear evidence of the effectiveness of the instruction.

Acquisition of an introduction strategy. All of the subjects successfully acquired the use of an introduction strategy during the instruction; all subject met criterion (i.e., they used an introduction strategy spontaneously in at least 80% of their opportunities to do so when meeting new people over at least two consecutive instructional sessions). The number of instructional sessions required to meet criterion varied across the subjects, ranging from 3 to 13 instructional sessions, with most of the subjects requiring 5 or fewer instructional sessions.

Generalization. As illustrated in Figure 1, all of the subjects generalized use of an introduction strategy to new partners not previously encountered during instruction, to new environments (e.g., new stores, locations at school), and to new communication tasks (e.g., using an introduction strategy when going to buy ice cream, using an introduction strategy when delivering a message to a new teacher).

Figure 1: Percent spontaneous use of an introduction strategy in obligatory contexts for each subject during baseline, instruction, and generalization and maintenance phases.

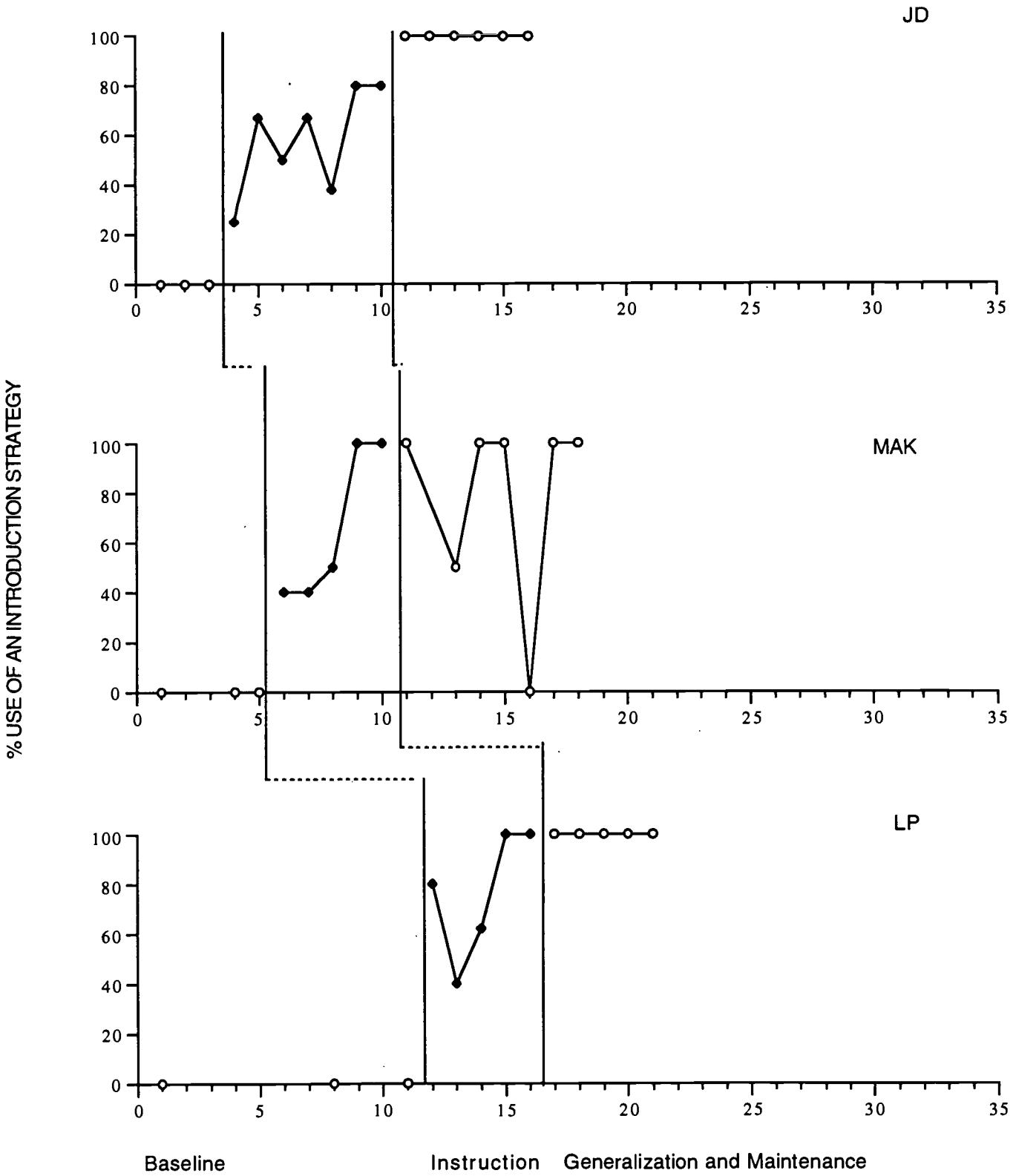
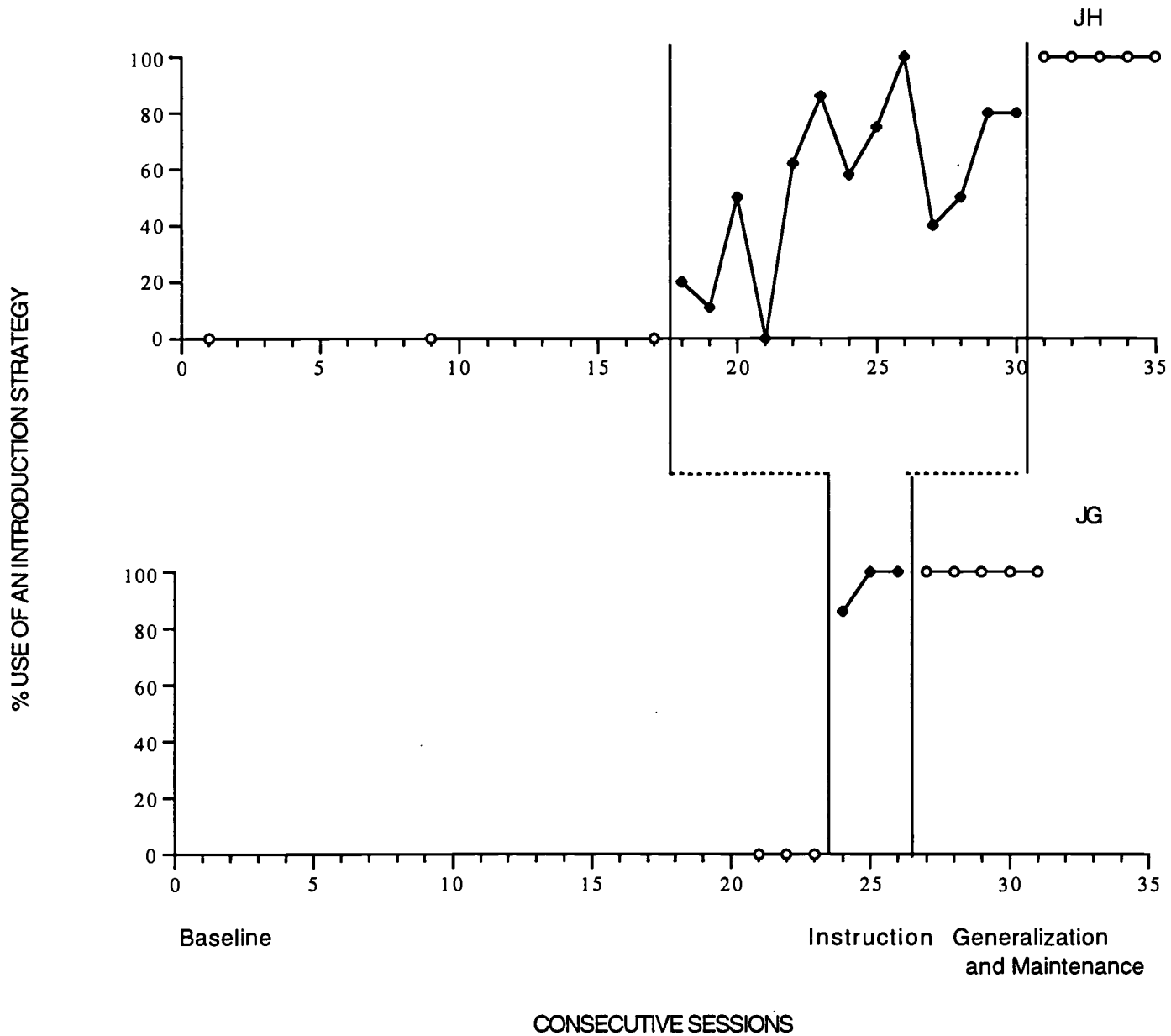


Figure 1 (continued) : Percent spontaneous use of an introduction strategy in obligatory contexts for each subject during baseline, instruction, and generalization and maintenance phases.



Maintenance. Probes of the subjects' generalized use of an introduction strategy continued for at least two months after instruction to ensure that the subjects maintained use of the skill. All of the subjects continued to use an introduction strategy spontaneously when meeting someone new even though formal instruction had ended. Only Subject #2, MAK, demonstrated any decrease in her spontaneous use of an introduction strategy post-instruction (see Figure 1). The probe conducted for MAK, one month after instruction had ended, indicated that she used an introduction strategy in only 50% of the situations where one was required. MAK and the residential counselors in her group home reported that she was not feeling well during the one month probe; her spontaneous use of an introduction strategy returned to her previous levels of competence over the next two maintenance probes (one week and two weeks later at 5 weeks and 6 weeks post-instruction respectively). MAK's performance declined again in the probe 9 weeks after instruction had ended. Again, MAK and the group home staff attributed this decline to health problems. In subsequent probes, 10 weeks and three months after instruction, MAK demonstrated 100% spontaneous use of her introduction strategy when it was required.

Social validation. The measures of social validation supported the quantitative observations of positive changes in the communication of the AAC users. All of the participants and the significant others in their lives (e.g., teachers, parents, residential counselors) reported high levels of satisfaction with the instructional program and its outcomes. All of the individuals who used AAC reported that they were more effective communicators as a result of the instruction; they reported fewer difficulties in their interactions with unfamiliar partners. The significant others concurred that the use of an introduction strategy had enhanced the communicative competence of the AAC users.

As a second measure of social validation, from a broader social perspective, twenty adults with no prior experience in AAC, blind to the goals of the instruction, reviewed videotaped interactions of each of the AAC users at baseline and post-instruction. The adults were blind as to whether the videos represented baseline or post-instruction phases. Results provided further validation of the efficacy of the instruction. For 4 of the 5 subjects (JD, MAK, LP, and JH), the majority of the adults indicated that the AAC users were more competent communicators in the interactions post-intervention. For the fifth subject (JG), no clear pattern of results emerged: 35% of the adults selected the baseline tape as the one in which JG was the more competent communicator; 35% selected the post intervention tape; and, 30% indicated that there was no difference between the two videos in terms of JG's communicative competence. It should be

noted that the video tapes used for social validation were not controlled videotapes, but were videotapes of actual interactions with new partners. Therefore, partners, environments, and topics of communication varied naturally across the baseline and post-instruction videos, just as they do in real life. In the case of JG, the new partner in the baseline tape had excellent interaction skills; she demonstrated a high comfort level in the interaction with JG, even though he did not use an introduction strategy. She had no difficulty understanding his communication and naturally facilitated the interaction. It was not clear in this baseline tape that JG needed to use an introduction strategy to facilitate communication with this particular partner. While the AAC users in this investigation were taught to use an introduction strategy with every new communication partner, it may be true that there are situations and partners where use of an introduction strategy is not always required.

Investigation #7: Acquisition, Generalization, and Maintenance of Partner-focused Questions

This section presents specific information about the research questions, subjects, measures, and results for Investigation #7 which focused on the acquisition, generalization, and maintenance of partner-focused questions by individuals who use AAC (Light, Binger, Agate, Corbett, Gullapalli, Lepkowski, & Ramsay, 1996; Light, Binger, Agate, & Ramsay, 1996). This information supplements the information on the general methods for the three investigations that was presented earlier.

Research Questions for Investigation #7

The results of Investigation #2 under Objective #1 indicated that the use of partner-focused questions seemed to contribute positively to the communicative competence of AAC users as perceived by adults with and without experience in AAC. Based on these results, it seems reasonable to conclude that learning to ask partner-focused questions is an important goal to enhance the socio-communicative skills of AAC users and to improve their overall communicative competence. To date, no instructional programs have been developed or evaluated to teach partner-focused questions to individuals who use AAC. Therefore, the purpose of Investigation #7 was to develop, implement, and evaluate an instructional program to teach AAC users to ask partner-focused questions within their social interactions with adults. The specific research questions addressed were as follows:

1. Does the instruction result in the successful acquisition and spontaneous use of partner-focused questions by individuals who use AAC?
2. Does the instruction result in generalized use of partner-focused questions by individuals who use AAC to new partners, environments, and tasks in the natural environment?
3. Does the instruction result in maintenance of the spontaneous use of partner-focused questions by individuals who use AAC after formal instruction ends?
4. Are the acquisition of partner-focused questions and the resulting outcomes valued by the individuals who use AAC, and the significant others in their lives?
5. Do the use of partner-focused questions and the resulting outcomes enhance the communicative competence of the individuals who use AAC as perceived by adults with no prior experience in AAC?

Subjects for Investigation #7

Six subjects participated in the investigation. Table 32 provides demographic information on the subjects and their instructors.

Subject #1, MAK, was a 44 year old woman with cerebral palsy. She had participated in the study on the use of an introduction strategy (Investigation #6,) six months prior to the present study. Detailed background information on this subject is provided in the section on Investigation #6. Learning to ask partner-focused questions was considered to be a priority for MAK, since her communication tended to be self-focused. She enjoyed social interactions with others, but had limited means to initiate interactions. She was eager to enhance her social interaction skills. Instruction in the use of partner-focused questions was conducted at MAK's work program by her SLP. MAK's SLP had a Masters degree in Speech Language Pathology. She had worked for 4 years with approximately 20 individuals who used AAC. She had completed one graduate course in AAC and had attended various assistive technology workshops and conferences since graduation.

Table 32

Demographic Information on the Subjects and Instructors in Investigation #7 (Use of Partner-Focused Questions)

Subject	Age	Gender	Disability	AAC Systems	Instructor(s)
#1 MAK	44	F	Cerebral palsy	Eye pointing; Light Talker with Language, Living & Learning software	SLP
#2 MKN	25	M	Cerebral palsy	Eye pointing; Communication board with line drawings; Liberator with Words Strategy software	SLP and graduate student in SLP
#3 RC	33	M	Mental retardation	Speech approximations; gestures; Walker Talker with pre-programmed words & phrases; communication board with line drawings	Graduate student in SLP (under supervision)
#4 JG	35	M	TBI	Speech; oral spelling; gestures, IBM compatible lap top with EZ Keys software & Multivoice synthesizer	Graduate student in SLP (under supervision)
#5 MW	13	M	Mental retardation	Some speech; gestures; Dynavox	Teacher in consultation with SLP
#6 EB	10	F	Cerebral palsy	Eye pointing; vocalizations; Dynavox	SLP

Subject #2, MKN, was a 25 year old man with severe cerebral palsy. Vision and hearing were reported to be within normal limits. He had no functional use of his hands or legs and was dependent in all activities of daily living. He was typically seated in a manual wheelchair and was awaiting a powered chair to allow independent mobility. MKN had no functional speech. He communicated by means of eye pointing, a light tech communication book of words and line drawings, and a computer-based voice output system, a Liberator with Words Strategy software. He controlled the Liberator via row column scanning with a single head mounted switch. MKN retrieved words or messages prestored on the Liberator; he occasionally used letter by letter spelling. MKN was able to understand basic conversation. He could read simple texts. MKN lived at home with his mother in a rural area. He had been referred to the Office of Vocational Rehabilitation to explore his vocational options. MKN was motivated to interact with others, but had had limited social experiences. He needed to further develop his social skills to enhance his vocational options. Learning to ask partner-focused questions was considered a priority. Instruction for MKN was provided by his SLP and by a graduate student in SLP; this instruction was community-based. MKN's SLP had worked for 16 years; during that time, she had worked with more than 50 individuals who used AAC. The graduate student in speech language pathology had two years work experience with more than 20 individuals who used AAC. Both had taken a graduate course in AAC during their preservice programs.

Subject #3, RC was a 33 year old man with mental retardation. His hearing and vision were within normal limits. He had good motor function and walked independently. He had a mild receptive language impairment and a moderate to severe expressive language impairment. He used various means to communicate including natural speech, gestures, a light tech communication book of line drawings, and a computer-based voice output system, a Walker Talker. He retrieved prestored messages on the Walker Talker via direct selection with the index finger of his right hand. RC lived in a group home and attended a sheltered workshop. His goal was to get a job in the community. Learning to ask partner-focused questions was considered a priority to enhance his social skills. Instruction in partner-focused questions was provided by a graduate student in speech language pathology under the supervision of a SLP. Instruction was provided in a community-based model of service delivery. The graduate student had one year's experience working in AAC; during that time, she had worked with 6 individuals who used AAC. She had completed three graduate courses in AAC.

Subject #4, JG, was a 35 year old man who had experienced a head injury in a motor vehicle accident. He participated in the study on the use of an introduction strategy (Investigation

#6) as well. Demographic information on this subject and his instructor is provided in the previous section on Investigation #6. Instruction in partner-focused questions began for this client once he had achieved criterion in the use of an introduction strategy.

Subject #5, MW, was a 13 year old male with a developmental disability resulting in a moderate cognitive impairment. His hearing and corrected vision were within normal limits. MW was able to walk independently and had good hand function. He lived at home in a rural area with his parents and one older sibling; he had five other siblings, all of whom were adults who lived away from home. He attended a special education life skills support class at the local middle school. He was mainstreamed with his age-level peers for home room and physical education classes. MW understood basic social conversations. He performed best when language input was concrete and specific. MW had a limited vocabulary of spoken words that he used alone or in short telegraphic utterances to express his needs and wants, and to interact in routine social situations (e.g., "I snack"; "I go home"; "Teacher help"; "Bathroom?"; "Not me"; or "Get drink?"). His speech was approximately 35-45% intelligible with unfamiliar partners and was characterized by numerous phoneme substitutions and deletions. MW used pointing and gestures to communicate as well (for example, head nod, shoulder shrug, pointing to a desired object). He used a computer-based voice output communication aid, a Dynavox, to augment his natural speech and gestures. He controlled his Dynavox via the touch screen using the index finger of his right hand. He had approximately 300 vocabulary items pre-programmed into his Dynavox, including full sentences, carrier phrases, and single words. Since MW could not read or spell, these items were represented on the Dynavox as line drawings. The Dynavox was mounted on a small cart which he pushed around with him. Although MW seemed to enjoy interacting with others socially, he was quite shy and did not readily initiate conversation with others. His teacher indicated that learning to use partner-focused questions was a priority for MW to enhance his social skills in order to be better prepared for future vocational opportunities and community involvement. MW's life skills teacher served as the primary instructor in consultation with his SLP. She implemented the instructional program with MW on a daily basis within the regular classroom routine. MW's teacher had a Masters degree in Special Education. She had worked for 20 years; during that time, she had worked with approximately 22 individuals who used AAC.

Subject #6, EB, was a 10 year old girl who had cerebral palsy. Her hearing was within normal limits. She had a visual impairment, but was able to see letters or line drawings approximately one half inch in size at a distance of up to two feet. She had limited function of her hands and arms. She used a walker to walk short distances, but was more typically seated in a

powered chair. She used a variety of means to communicate including vocalizations, eye pointing, and a computer-based voice output system, a Dynavox. She controlled the Dynavox via direct selection on the touch screen with her right thumb. She communicated via prestored sentences and short phrases stored on the Dynavox. EB lived in a rural area; she attended a life skills program in the local elementary school. EB was very interested in interacting with others, but she had few means to effectively initiate conversations with others. She typically occupied a respondent role in conversations and seldom asked questions of others. Instruction in the use of partner-focused questions was provided by her SLP within her classroom program. EB's SLP had a Masters degree. She had worked for 3-4 years; during that time, she had worked with approximately 12 individuals who used AAC. She had completed a graduate course in AAC and had attended an inservice workshop on assistive technology since graduation.

Instructional Procedures for Investigation #7

The specific instructional procedures for Investigation #7 are documented in the instructional module in Appendix E. Procedural reliability was calculated for each of the instructors on randomly selected sessions, representing at least 15% of the sessions. The mean procedural reliability for the six instructors was 96% agreement with the standard (ranging from 95.5% - 98.9%), indicating a high level of reliability with the procedures documented in the instructional module.

Measures for Investigation #7

The dependent variable of interest in Investigation #7 was the use of partner-focused questions. Partner-focused questions were defined as questions that are about the communication partner and his/her experiences (e.g., "How are you?", "What are you doing tonight?", "How was your weekend?"). Each opportunity to ask a partner-focused question was coded. To be coded as spontaneous, the AAC user had to ask a partner-focused question following natural cues indicating the opportunity to do so. Interobserver reliability checks were conducted on randomly selected sessions representing at least 15% of the sessions during the baseline, instruction, and generalization and maintenance phases. The mean interobserver agreement (number of agreements divided by the number of agreements plus disagreements plus omissions) across the six subjects was 95.7% agreement (range of 90.5% - 100% agreement).

Results of Investigation #7

Figure 2 presents data on the spontaneous use of partner-focused questions by the six subjects for each of the three phases of the study (baseline, instruction, and generalization and maintenance). Comparisons of the six subjects' performances at baseline with those during the maintenance phase post-intervention provide clear evidence of the effectiveness of the instruction.

Acquisition of partner-focused questions. All of the subjects successfully learned to ask partner-focused questions during the instruction. The number of instructional sessions required before the participants met criterion (i.e., spontaneous use of partner-focused questions in at least 80% of the opportunities to do so in two consecutive instructional sessions) varied, ranging from 4 to 29 sessions. All of the subjects except EB required fewer than 15 instructional sessions. As is apparent in Figure 2, EB required 10 sessions to learn to ask partner-focused questions during the initial phase of instruction; she required an additional 19 "booster" sessions to maintain her spontaneous use of partner-focused questions post-instruction (please see the section on Maintenance for further discussion of EB's performance).

Generalization. All of the subjects generalized use of partner-focused questions to new partners and new situations. JG experienced initial difficulties generalizing from instructional sessions to new situations in the natural environment; in the initial generalization probes post-instruction, his spontaneous use of partner-focused questions was only 33% and 29%. With continued practice in the natural environment in varied situations, however, JG's performance improved significantly. Subsequent generalization probes all exceeded 80% spontaneous use of partner-focused questions (see Figure 2).

Maintenance. Probes of the subjects' use of partner-focused questions continued for at least two months after instruction ended to ensure that the subjects maintained use of the skill. Five of the six subjects continued to ask partner-focused questions spontaneously in social interactions even though formal instruction had ended.

Figure 2: Percent spontaneous use of partner-focused questions in obligatory contexts for each subject during baseline, instruction, and generalization and maintenance phases

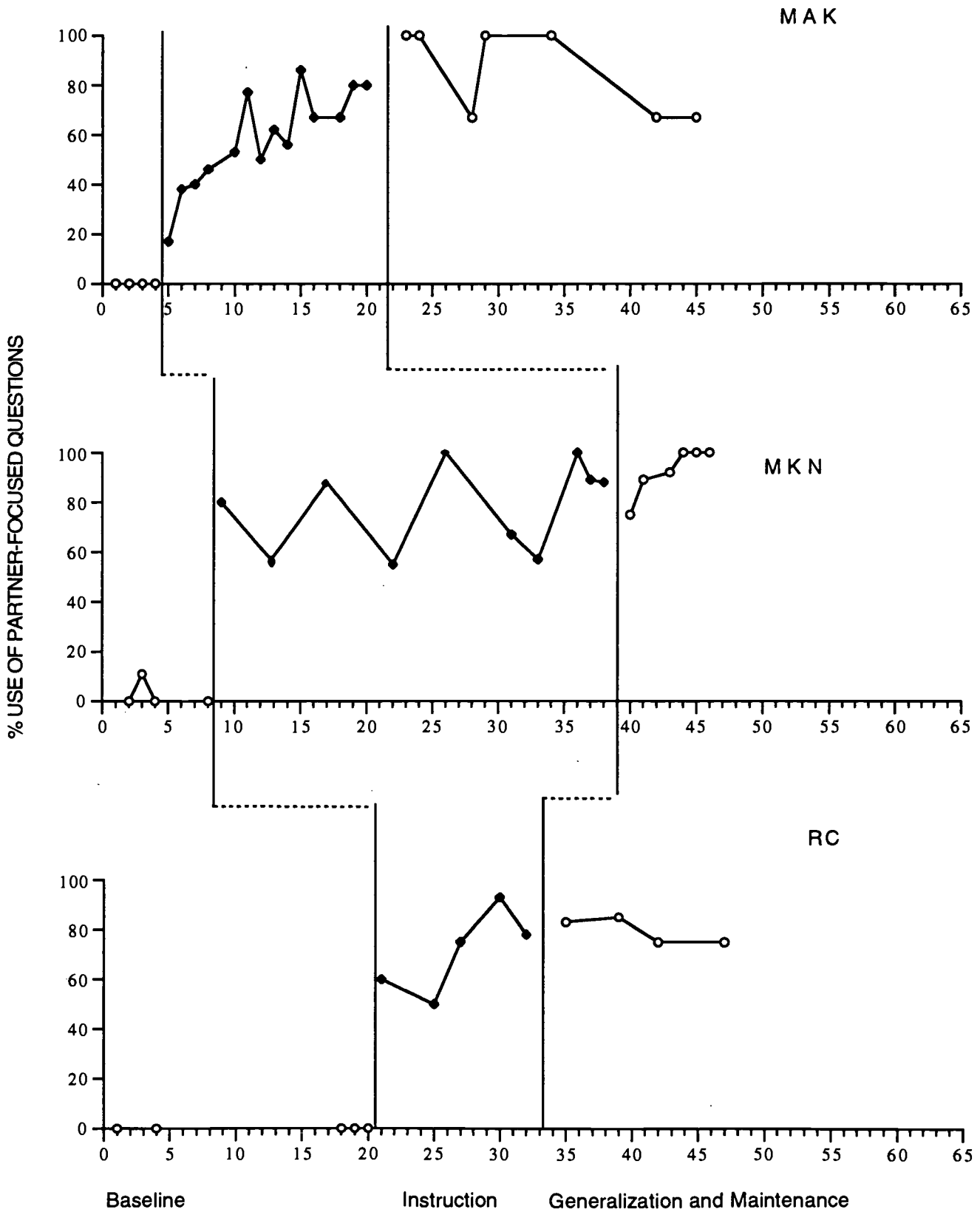
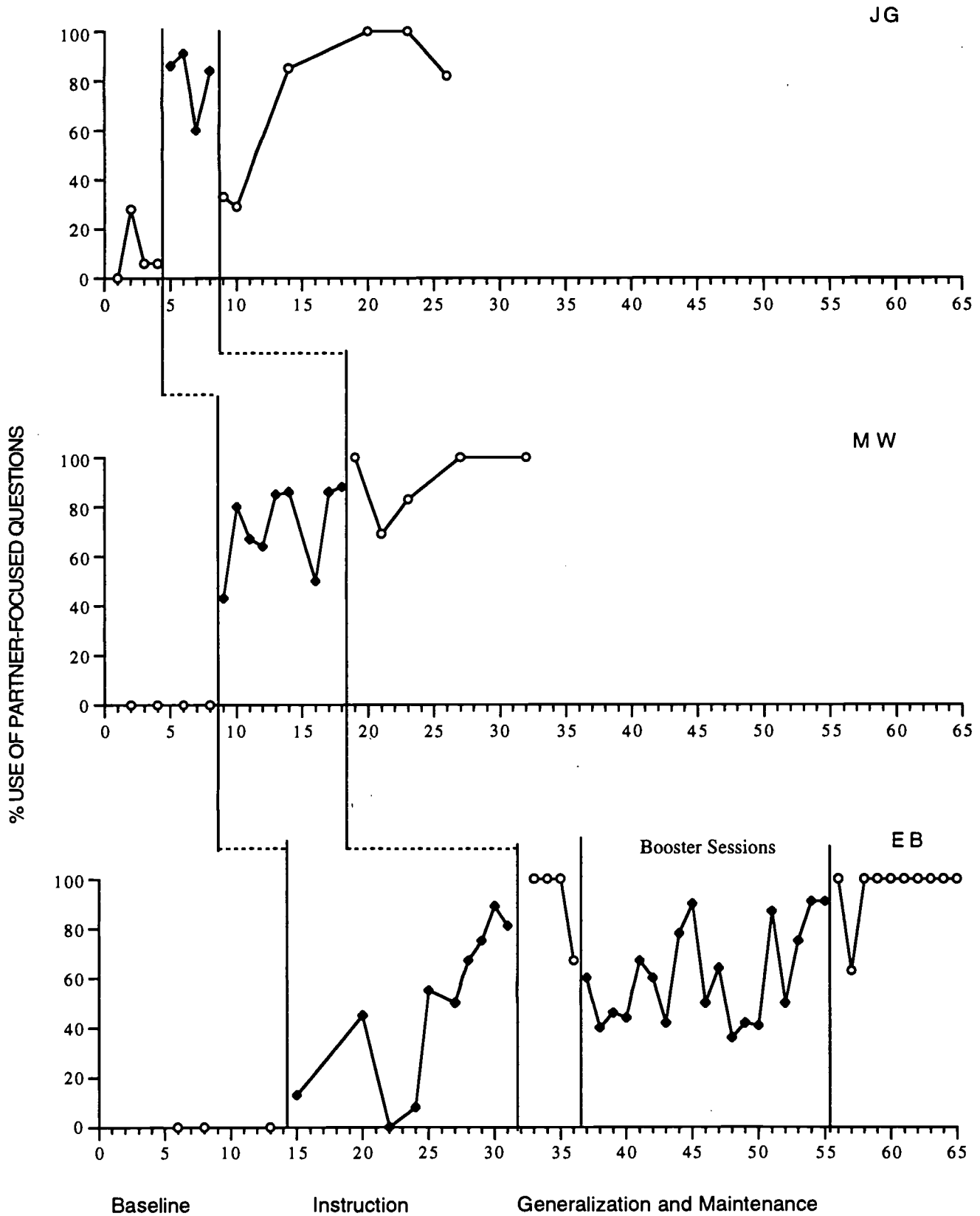


Figure 2 (continued): Percent spontaneous use of partner-focused questions in obligatory contexts for each subject during baseline, instruction, and generalization and maintenance phases



Subject #6, EB, generalized use of partner-focused questions to new situations in the natural environment immediately following instruction and continued to ask partner-focused questions spontaneously in 100% of her opportunities up to one month post-instruction. Six weeks after instruction, however, EB's performance showed a significant decline to 66% spontaneous use of partner-focused questions. While this performance was still substantially above her original baseline levels of 0%, it fell below criterion (i.e., 80% spontaneous use). Therefore, additional instructional sessions were implemented as 'booster sessions'. EB required an additional 19 instructional sessions to reach criterion again. After these booster sessions, she demonstrated generalized use of partner-focused questions to naturally occurring interactions within her daily routine and maintained spontaneous use of partner-focused questions during weekly probes that continued over a two month period after the booster sessions ended. The reasons for EB's decline in performance 6 weeks post-instruction are not clear. Illness, absence from school, school holidays, or other variables may account for the decline.

Social Validation. The measures of social validation supported the quantitative observations of positive changes in the communication of the AAC users. The participants and the significant others in their lives (e.g., teachers, parents, residential counselors) all reported high levels of satisfaction with the instructional program and its outcomes. All of the individuals who used AAC reported that they were more effective communicators as a result of the instruction; they reported that people interacted with them more frequently once they started to ask partner-focused questions and that partners interacted for longer periods of time. The significant others concurred that the use of partner-focused questions had enhanced the communicative competence of the AAC users; many expressed surprise at the pleasant change in the quality of interactions with the individuals who used AAC.

As a measure of the value of the instruction and its outcomes from society's perspective, twenty adults with no prior experience in AAC, blind to the goals of the instruction, reviewed videotaped interactions of each of the AAC users. These adults were blind to the experimental condition of the videotapes observed. Results provided further validation of the efficacy of the instruction. For 4 of the 6 subjects (MAK, MKN, MW, and EB), the majority of the adults indicated that the AAC users were more competent communicators in the interactions post-intervention. For two of the subjects (JG and RC), the adults indicated no clear preference between the baseline and post-instruction videotapes. It should be noted that the video clips viewed were short (approximately 2 minutes in length); as a result, there were not a significant number of opportunities for partner-focused questions in these interactions. The adult observers

may not have had a large enough sample of interaction to evaluate the competency of the individuals using AAC.

Investigation #8: Acquisition, Generalization, and Maintenance of Nonobligatory Turns

This section presents specific information about the research questions, subjects, measures, and results for Investigation #8 into the acquisition, generalization, and maintenance of nonobligatory turns by individuals who use AAC and who have efficient rates of communication (Light, Binger, Bailey, & Millar, 1986). This information supplements that presented earlier on the general methods employed in all three investigations under Objective #2.

Research Questions for Investigation #8

The results of Investigation #3 under Objective #1 indicated that the use of nonobligatory turns contributed positively to the communicative competence of AAC users who had efficient rates of communication, according to adults with and without experience in AAC. This skill also seemed to contribute to positive perceptions of the competence of AAC users who had efficient rates of communication, according to adolescents without prior experience in AAC. Based on these results, it is apparent that use of nonobligatory turns (and increased participation in interactions) is an important goal to enhance the communicative competence of AAC users with efficient rates of communication. To date, no instructional programs have been developed or evaluated to teach the use of nonobligatory turns to this group of individuals who use AAC. Therefore, the purpose of Investigation #8 was to develop, implement, and evaluate an instructional program to teach AAC users with efficient rates of communication to take their nonobligatory turns within their social interactions. The specific research questions addressed were as follows:

1. Does the instruction result in the successful acquisition and spontaneous use of nonobligatory turns by individuals who use AAC who have efficient rates of communication?
2. Does the instruction result in generalized use of nonobligatory turns by individuals who use AAC to new partners, environments, and tasks in the natural environment?
3. Does the instruction result in maintenance of the spontaneous use of nonobligatory turns by individuals who use AAC after formal instruction ends?

4. Are the acquisition of nonobligatory turns and the resulting outcomes valued by the individuals who use AAC, and the significant others in their lives?
5. Do the use of nonobligatory turns and the resulting outcomes enhance the communicative competence of the individuals who use AAC as perceived by adults with no prior experience in AAC?

Subjects for Investigation #8

Five subjects participated in the investigation. Table 33 provides demographic information on the subjects and their instructors.

Subject #1, LP, was a 13 year old girl who had developmental apraxia and a moderate cognitive impairment. She used natural speech as her primary means of communication; she made numerous consonant substitutions and deletions. She augmented her speech with gestures, a few signs, and a communication book of words that she used for clarification and for elaborated messages. She attended a learning support class at a middle school and was integrated for part of the day with her age level peers. She was able to read basic texts and write simple sentences. LP's hearing was reported to be within normal limits; her corrected vision was also within normal limits. LP was able to walk independently although she had difficulty with balance and coordination. LP participated infrequently in interactions with others. She typically fulfilled her obligatory turns with minimal responses (e.g., yes/no or single word responses); she forfeited her optional turns in interactions. A priority for LP was to encourage her to interact more frequently in interactions. Fey (1989) argued that the first goal for passive communicators such as LP should be to increase their participation so that they have the opportunity to improve their communication and language skills. Therefore, learning to take nonobligatory turns in social interactions was identified as a priority for LP. Instruction was provided for LP by the SLP at her school. LP's SLP had a Masters degree in Speech Language Pathology. She had been working for 3 years and had worked with approximately 15-20 students who used AAC during that time. She had completed some AAC course work during her preprofessional training and had attended an inservice program on assistive technology since graduation.

Table 33

Demographic Information on the Subjects and Instructors for Investigation #8 (Use of Nonobligatory Turns)

Subject	Age	Gender	Disability	AAC Systems	Instructor(s)
#1 LP	13	F	Developmental delay	Speech; gestures; communication board of words	SLP
#2 SA	4	F	Cerebral palsy; seizure disorder	Some speech approximations; eye pointing; gestures; signs; communication boards of line drawings	SLP
#3 TM	9	F	Mental retardation	Some speech approximations; gestures; signs; remnant book	SLP
#4 JB	21	F	Cerebral palsy, severe mental retardation	Vocalizations; signs; communication book of line drawings; Wolf	SLP
#5 DB	14	M	Autism	Few speech approximations; gestures; Macaw; Dynavox	Teacher in consultation with SLP

Subject #2, SA, was a four year old girl. She had cerebral palsy with a right sided hemiparesis and a seizure disorder. She lived at home with her family in a rural area. She attended an integrated preschool 2 half days a week and a special education program for children with multiple handicaps 2 half days a week. Her hearing was reported to be within normal limits. She had a visual impairment that was corrected with glasses. SA crawled independently; she was learning to walk with a walker. She could sit independently without support. She was able to follow familiar one step commands, presented in context; she performed best when partners used concrete vocabulary and simple sentence structure. She had approximately 50 speech approximations which could be understood by familiar partners; intelligibility was reduced due to dysphonia. She augmented her natural speech with eye pointing, pointing, and a few signs (e.g., more, all done). She also made use of several "mini" communication displays of line drawings that were kept in relevant locations around her home and preschool. She seldom initiated communication and tended to forfeit her turns in interactions with adults and peers. SA was taught to take nonobligatory turns by the SLP at her preschool program. This SLP had a Masters degree. She had been working for 10 years; during that time, she had worked with more than 30 individuals who used AAC.

Subject #3, TM, was a 9 year old girl with mental retardation. Her hearing and vision were both within normal limits. Her gross motor skills were good; fine motor skills were limited, but were functional for most activities of daily living. TM lived at home with adoptive parents and siblings in a rural area. She attended an intermediate life skills class. She understood basic conversation. She performed best when the topic was concrete and familiar. Formal testing indicated that her receptive language skills were at a 4;1 year level according to the Peabody Picture Vocabulary Test - Revised. TM had some speech approximations which she used to communicate. Her speech was telegraphic (e.g., "eat", "calendar", "push") and was difficult to comprehend due to numerous substitutions and deletions. She augmented her natural speech with gestures and signs. Her signs tended to be approximations of the required hand shape and movements, and were difficult to understand, even for partners familiar with sign language. She used a remnant book to carry information related to her daily experiences (e.g., a ticket stub, a balloon, a photo); she used these "remnants" to participate in conversations with others. TM typically fulfilled only her required turns in interactions. She answered questions directed to her, but seldom participated spontaneously in conversations with others. Instruction in the use of nonobligatory turns was provided by TM's SLP within the school program. Her SLP had a Masters degree in speech language pathology and 4 years of work experience. She had worked

with approximately 30 people who used AAC during her career. She had taken a graduate course in AAC during her preprofessional training and had attended various conferences and workshops in AAC since graduation.

Subject #4, JB, was a 21 year old woman with cerebral palsy with right hemiparesis, severe mental retardation, and a seizure disorder. Her hearing was reported to be within normal limits. She had an uncorrected visual impairment that required her to be close to materials and to use large one inch pictures. JB was able to sit independently; she used a walker for short distances and a wheelchair for longer distances. She had a severe receptive language impairment; she performed best within familiar routines, when language input was concrete and simple. She had two speech approximations (i.e., "Hi", "Bye"); she used vocalizations with appropriate intonation to communicate her affect. She used some signs to communicate; these signs were approximations of the correct hand shape and movement, and were only understood by familiar partners. She had a communication book with approximately 50 line drawings which she used to supplement her signs. JB lived in a group home and attended a life skills support class in the local high school. She was seldom expected to participate in conversations with others. Her communication was limited to basic needs and wants. Learning to participate in social interactions was considered a priority for JB to provide her with more opportunities to communicate with others. Instruction was provided by the SLP in JB's school program. The SLP had a Masters degree in Speech Language Pathology. She had been working for 3 years and had worked with approximately 15-20 students who used AAC during that time. She had completed some AAC course work during her preprofessional training and had attended an inservice program on assistive technology since graduation.

Subject #5, DB, was a 14 year old male with autism. DB lived at home with his parents and siblings. He attended an Autistic Support Class at the local high school. He had good motor skills; his hearing was within normal limits. He had been diagnosed with a visual impairment and prescribed glasses. He did not wear his glasses consistently; family and school personnel noted no significant behavioral changes with or without the glasses. DB was able to follow familiar instructions presented in context. He had approximately 15 spoken words that were understood by familiar partners in context (e.g., OK, Momma, Yeah, No, Car). He used gestures to augment his speech as well as computer-based voice output systems, a Macaw and a Dynavox. He had been using the Macaw in limited conversational contexts for approximately one year prior to the study; he was introduced to the Dynavox approximately one month prior to the study to provide access to more extensive vocabulary. DB accessed both of these systems using direct selection

with the middle fingers of his right and left hands. Prior to the instruction, DB typically communicated to express needs and wants. He seemed to want to engage others in social conversation, but frequently used inappropriate behaviors to do so (e.g., playing with the blinds in the classroom). Learning to take nonobligatory turns was a priority for DB to give him more appropriate ways to participate in social conversations. DB's teacher provided the instruction in consultation with his SLP. His teacher had a Masters degree in Special Education. She had been working for approximately a year and a half as a teacher in the autistic support class; during her career, she had worked with 10 individuals who used AAC.

Instructional Procedures for Investigation #8

The instructional procedures for Investigation #8 are documented in the instructional module in Appendix F. Procedural reliability was calculated for each of the instructors on randomly selected sessions, representing at least 15% of the sessions. The mean procedural reliability for the six instructors was 93.9% agreement with the standard (ranging from 89% - 98%), indicating a high level of compliance with the procedures documented in the instructional module.

Measures for Investigation #8

The dependent variable of interest in Investigation #8 was the use of nonobligatory turns. Nonobligatory turns were defined as turns that followed a partner's comment or statement. For the purposes of this study, minimal interjections were targeted as nonobligatory turns (e.g., "Cool", "No way", "Yeah" "Alright"). These minimal interjections were targeted because they were quick to produce and minimally complex from a linguistic perspective. Once the participants acquired competence in taking these minimal turns, more complex turns could be introduced. Each opportunity to take a nonobligatory turn was coded. To be coded as spontaneous, the AAC user had to take a nonobligatory turn without prompting, following natural cues indicating the opportunity to do so. For each of the participants, several potential nonobligatory turns were identified with appropriate modes to communicate these turns: LP used natural speech to communicate turns such as "Cool", "Neat", "No way", "Yeah", and "Nah"; SA also used natural speech to communicate her nonobligatory turns (e.g., "Yeah", "Oh-oh", "Wowee", "Oh", "Oh boy", "Yucky"); TM used gestures, signs, and natural speech to communicate her nonobligatory turns (e.g., "Fun", "OK", "Yuck", "Why?", "Yeah"); JB used gestures and line drawings in her communication book to take her nonobligatory turns (e.g., "Yeah", "Yummy", "Wow",

"Awesome", "Yuck", "Bad", "Oh no", high five); and DB used natural speech and messages preprogrammed into his voice output systems to communicate his nonobligatory turns (e.g., "Yes", "No", "That's great", "No way", "That's silly", "Yuck", "Uh uh").

Interobserver reliability checks were conducted on randomly selected sessions representing at least 15% of the sessions during the baseline, instruction, and generalization and maintenance phases. The mean interobserver agreement (number of agreements divided by the number of agreements plus disagreements plus omissions) across the five subjects was 94.5% agreement (range of 89% - 100% agreement).

Results of Investigation #8

Figure 3 presents data on the spontaneous use of nonobligatory turns by the five subjects for each of the three phases of the study (baseline, instruction, and generalization and maintenance). Comparisons of the five subjects' performances at baseline with those during the generalization and maintenance phase post-intervention provide clear evidence of the effectiveness of the instruction.

Acquisition of nonobligatory turns. All of the subjects successfully learned to take nonobligatory turns during the instruction. The number of instructional sessions required before the AAC users met criterion (i.e., spontaneous use of nonobligatory turns in at least 80% of the opportunities to do so in two consecutive instructional sessions) varied somewhat across the subjects, ranging from 7-10 sessions.

Generalization and maintenance of nonobligatory turns. There was clear evidence that three of the five subjects (i.e., LP, TM, and JB) successfully generalized use of nonobligatory turns to new partners (adults and peers), new situations, and new communication tasks (e.g., food preparation, story reading). Furthermore, these participants all maintained their spontaneous use of nonobligatory turns in their social interactions across repeated maintenance probes in the natural environment for at least two months post-instruction. Subject #2, SA, also seemed to generalize use of nonobligatory turns and maintain this use post-instruction. Unfortunately, however, generalization and maintenance data for SA are limited to a single probe that occurred more than two months after instruction. SA was ill with viral pneumonia for many weeks after instruction ended. As a result, she only had a single generalization/maintenance probe which occurred more than two months after instruction. Her performance during this probe suggested that she maintained high levels of turn taking (with adults and peers) despite her illness.

Figure 3: Percent spontaneous use of nonobligatory turns for each subject during baseline, instruction, and generalization and maintenance phases.

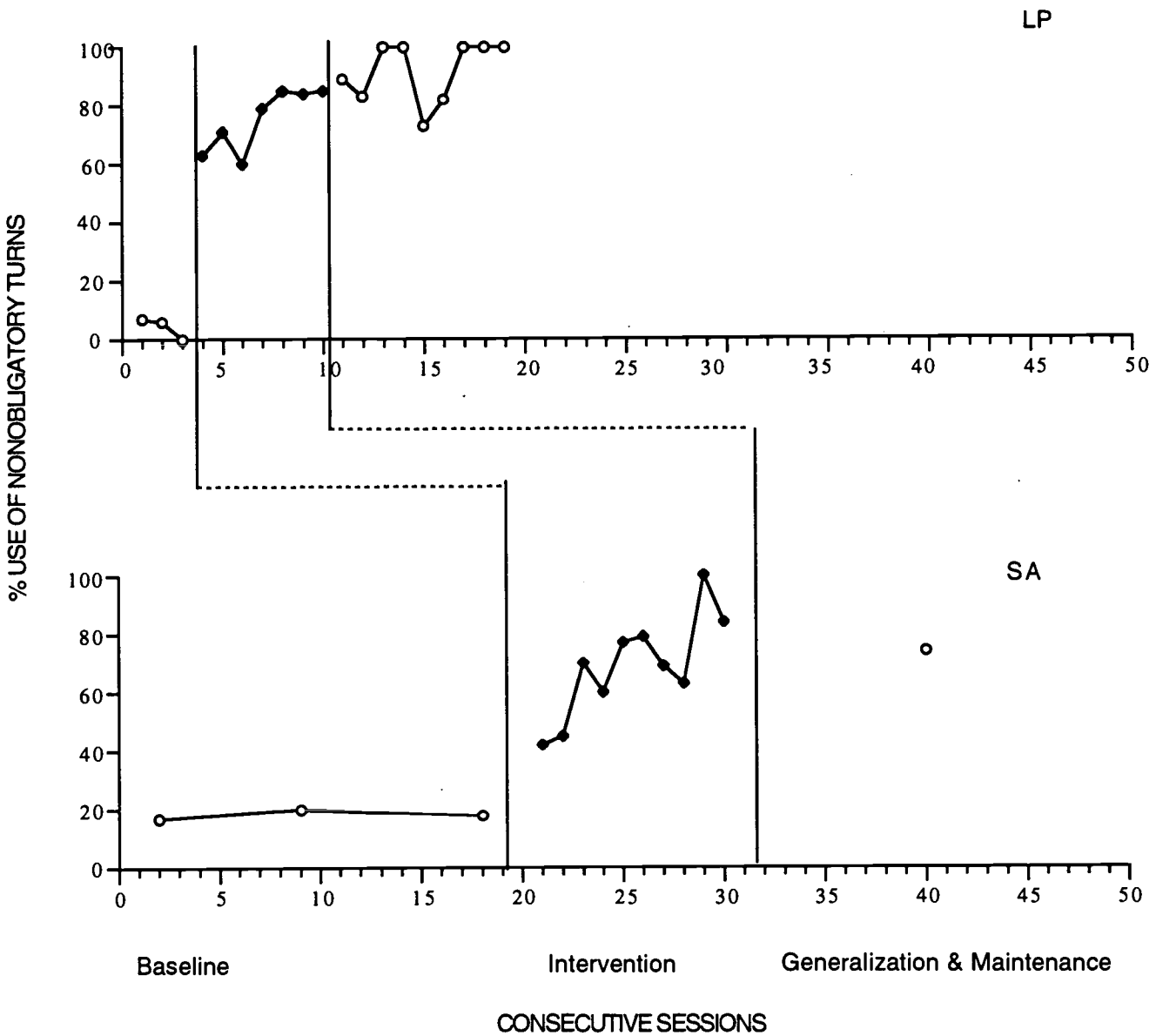
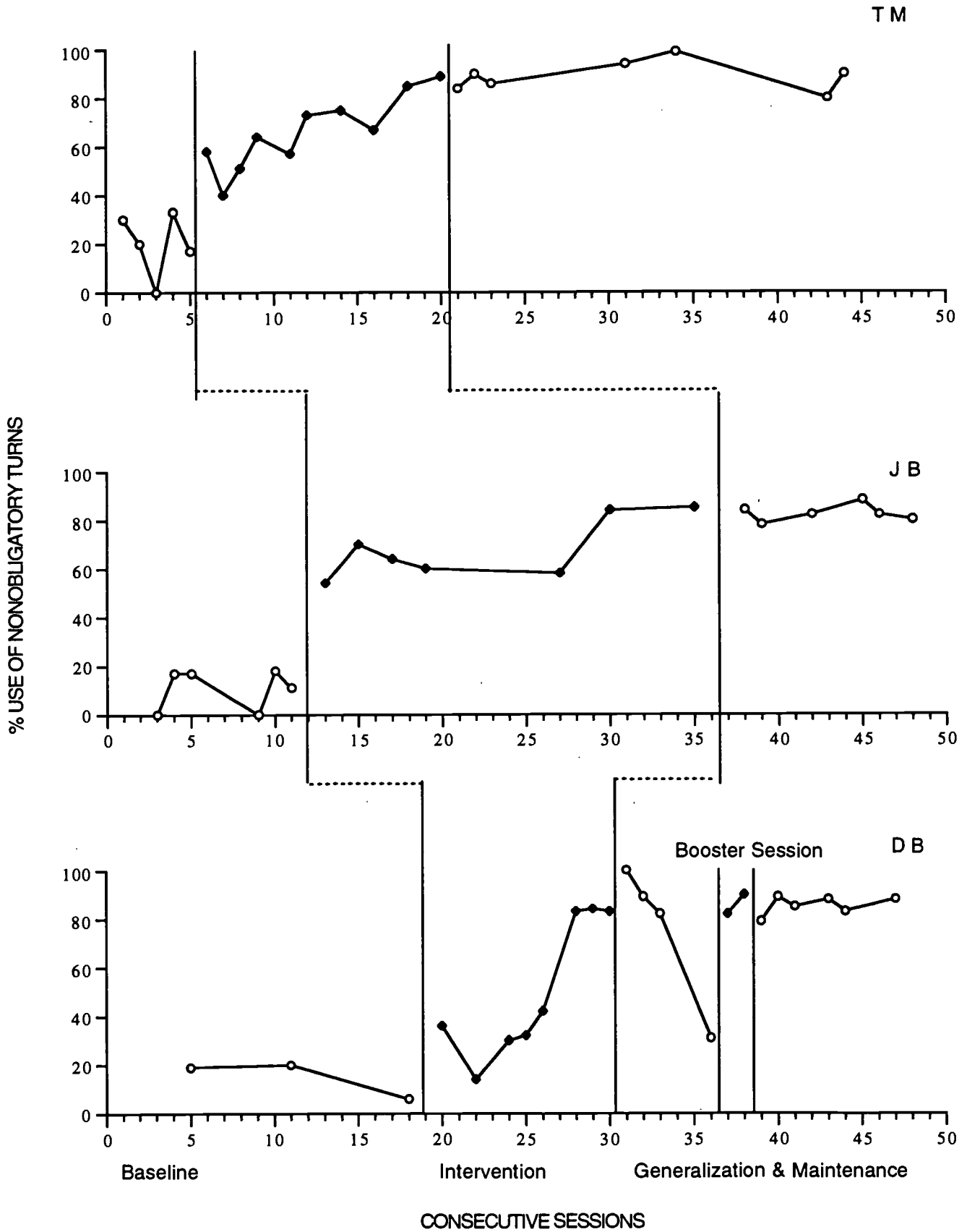


Figure 3 (continued): Percent spontaneous use of nonobligatory turns for each subject during baseline, instruction, and generalization and maintenance phases.



Subject #5, DB, had no difficulty generalizing the use of nonobligatory turns to interactions with his teacher in new tasks and environments immediately following instruction; generalization probes conducted 2 days, 3 days, and 1 week following instruction demonstrated 100%, 88%, and 82% spontaneous use of nonobligatory turns with his teacher in various environments and tasks. However, DB's performance decreased dramatically to 31% in the probe two weeks post-instruction. Two "booster" instructional sessions were implemented. DB maintained his spontaneous use of nonobligatory turns above criterion level in interactions with his teacher in various tasks and situations for more than two months after the booster sessions (see Figure 3).

Although DB performed well with his teacher in various situations and communication tasks post-instruction, he had difficulty generalizing his use of nonobligatory turns to new partners. The data in Figure 3 for DB represent his interactions with one partner only, his teacher, in various communication tasks and situations. Generalization probes with new partners revealed decreased use of nonobligatory turns. For example, in generalization probes, post-instruction, in social interactions with the teacher's aide in his class, DB took only 35% of his nonobligatory turns; in probes with an unfamiliar adult partner, he took 37% of his nonobligatory turns. While these levels represented an increase from his mean baseline level of 15%, they were well below criterion. Additional instructional sessions were implemented with DB in interactions in his natural environment with various partners. It took DB 7 additional instructional sessions to meet criterion with his teacher's aide; it took him 17 additional sessions to generalize spontaneous use of nonobligatory turns to social interactions with an unfamiliar adult. DB maintained his generalized use of nonobligatory turns with new partners during probes conducted over a one month period after the additional instructional sessions.

Social validation. The measures of social validation were positive, providing additional support for the quantitative observations of positive changes in the communication of the AAC users. Some of the participants in this study (SA, JB, DB) had not developed the metacommunicative skills required to respond to the social validation interview or questionnaire. In these cases, social validation data were obtained from the significant others only. The significant others (e.g., teachers, parents, residential counselors) all reported high levels of satisfaction with the instructional program and its outcomes. They reported that the individuals who used AAC participated more frequently, and seemed more involved and interested in interactions after the instruction. All of the significant others commented that the individuals using AAC had started to convey more complex linguistic information in some of their

nonobligatory turns as well. Analyses of the nonobligatory turns used during the generalization and maintenance phases confirmed the observations of the significant others. For example, post-instruction, the participants took more complex nonobligatory turns such as the following: LP took turns such as "Playing computer", "Snow castles", "Last night"; SA took turns such as "There it go", "Look!"; TM took turns such as "Stuck", "By self", "Friends", "Dat say?"; JB took nonobligatory turns such as "Baby", "Pudding", "Thank you"; and, DB took nonobligatory turns such as "Go away", "Who's there?", "I love you", and "Book", post-instruction. The participants willingly participated in interactions once they knew that they had the time and opportunity to do so and once they knew that they were clearly expected to take turns.

As a measure of the value of the instruction and its outcomes from society's perspective, twenty adults with no prior experience in AAC, blind to the goals of the instruction, reviewed videotaped interactions of each of the AAC users. These adults were blind to the experimental condition of the videotapes observed. Results provided further validation of the efficacy of the instruction. For 4 of the 5 subjects (SA, TM, JB, and DB), the majority of the adults indicated that the AAC users were more competent communicators in the interactions post-intervention. For one of the subjects, LP, 35 % of the adults indicated that LP was a more competent communicator in the video post-instruction; 50% indicated no clear preference between the baseline and post-instruction videotapes; only 15% selected the baseline videotape. The video clips viewed were short (approximately 2 minutes in length); there were not a significant number of opportunities for nonobligatory turns in these interactions. The observers may not have had a large enough sample of interaction to evaluate LP's communicative competence fully.

Summary of the Results and Discussion of the Investigations Under Objective #2

Results of the three investigations indicated that the instructional programs resulted in the successful acquisition, generalization, and maintenance of new skills by individuals who used AAC (i.e., use of an introduction strategy, use of partner-focused questions, and use of nonobligatory turns). Results were replicated successfully across a range of individuals of different ages, with different skills and disabilities, using different AAC systems. Results were socially validated, providing evidence that the instruction and its outcomes were valued by the individuals who used AAC and their significant others, as well as by members of society who had no prior experience in AAC.

Three problems are frequently encountered in teaching new communication skills to people who use AAC: (a) the lack of spontaneous use of the target skills (without prompting); (b) the lack of generalization to new situations in the natural environment; and (c) the lack of long term maintenance after instruction. These problems typically occur when instruction is not designed to facilitate spontaneous use, generalization, and maintenance. The instructional procedures, used in the investigations under Objective #2, incorporated procedures to address each of these potential problems. These procedures are explained below.

Facilitating Spontaneous Use of New Skills

The goal of instruction in each of the investigations was for the individual to use the target skill spontaneously, without prompting, when cues to do so occurred naturally in daily life. If instruction is poorly designed, individuals who use AAC may not learn to recognize the range of natural cues that indicate when a target skill should be used; as a result, they may not learn to use the new skill spontaneously in situations where it is required (Sigafoos, Mustonen, DePaepe, Reichle, & York, 1991). This problem typically occurs when a new skill is taught in a single situation, and when each instructional session is practiced in exactly the same manner, following the same "script" (Light & Lindsay, 1992). When instruction follows this format, the individual has no opportunity to learn to use the new skill spontaneously in response to a range of natural cues. In order to encourage spontaneous use of the target skill in the natural environment, instruction should be conducted within the natural environment or in role plays using varied natural cues designed to simulate those encountered in daily life (Light & Lindsay, 1992). The instructional procedures used in the three investigations incorporated natural cues and varied these cues across learning trials, thus facilitating the development of spontaneous use.

When learning a new skill, an individual who uses AAC may not use the skill spontaneously at first and may need some type of prompt to produce the target skill. Three different types of prompts or cues were used in the instructional procedures in the three investigations: an expectant delay, a pointing cue, and a model. This cuing hierarchy was implemented to encourage the development of spontaneous skill use.

An expectant delay is a time delay procedure (Halle, 1982; Halle, Baer, & Spradlin, 1981; Schwartz, Anderson, & Halle, 1989). In this procedure, the instructor waits for a specified period of time for the learner to produce the target skill, after a natural cue occurs, before prompting in any other way. With an expectant delay, the instructor clearly indicates by an expectant facial expression (raised eyebrows) and body posture (leaning toward the individual) that the target skill

is required of the AAC user. Expectant delay has been demonstrated to be an effective technique to elicit communication from individuals who use AAC (Buzolich, King, & Barody, 1991; Glennen & Calculator, 1985; Light & Binger, 1996b; Light, Binger, Bailey, & Millar, 1996; Light, Binger, Agate, & Ramsay, 1996; Light, Collier, & Parnes, 1985a). Use of an expectant delay is particularly advantageous because it allows extra time for the individual who uses AAC to process, formulate a turn, and then produce the required turn. Expectant delay provides the individual who uses AAC with the opportunity for independent performance, even if production of the target skill requires more time in the initial stages of learning. Expectant delay is especially effective with individuals who are seldom provided with the opportunity to communicate in the natural environment and who have come to expect that communication is neither required nor invited from them (Basil, 1992; Calculator, 1988). Using expectant delay marks clearly the communicative opportunity for the AAC user, indicates explicitly the expectation for communication, and allows the individual who uses AAC lots of time to formulate and produce the required skill.

During the instruction, if the individual did not produce the target skill after an expectant delay, the next prompt used to cue the learner was a pointing cue. With a pointing cue, the instructor gestures toward the AAC user and his/her system, looks at the individual, and waits expectantly. A pointing cue is quick and easy to deliver. It is a distinct visual cue that makes the opportunity and the need for the target communicative skill even more apparent than an expectant delay (Reichle & Sigafoos, 1991). However, use of a pointing cue is still minimally intrusive to the flow of the interaction. Unlike a verbal cue, a pointing cue does not interrupt the flow of conversation and impose a potential distraction.

If the individual did not produce the target skill after the pointing cue, the next cue used to prompt the individual was a model. Models demonstrate for the learner exactly what his/her next action should be (Reichle & Sigafoos, 1991). For example, the instructor models by selecting the target message on the AAC user's computer-based voice output system or the instructor models by producing the sign(s) or gesture(s) required and saying the message. Several instructional programs that have proved to be effective with individuals who use AAC have incorporated the use of models (Buzolich et al., 1991; Glennen & Calculator, 1985; Light & Binger, 1996b; Light, Binger, Bailey, & Millar, 1996; Light, Binger, Agate, & Ramsay, 1996). As with the pointing cue, a model is relatively quick and easy to produce (Reichle & Sigafoos, 1991). The model provides more support to the learner than the pointing cue because it explicitly demonstrates the required skill.

The cuing (prompting) hierarchy used in the investigations moved from prompts that were least intrusive to those that were more intrusive: the instructor always started with a natural cue and then progressed through a sequence of prompts (expectant delay, point, model) until the learner produced the target skill. Cues were given to the AAC user only if required. A "least to most" prompting hierarchy has been used successfully to teach new skills to individuals with disabilities (e.g.,Buzolich, et al, 1991; Halle, 1987). One reason this type of hierarchy was selected is because it is easy to implement. The criterion for moving on to the next level of cuing is obvious: If the individual does not produce the target behavior, then the instructor moves on to the next level and provides more cuing support. One of the major advantages of a "least to most" prompting hierarchy is that it encourages spontaneous use of the target skill. In each instructional trial, the individual is always given the opportunity to use the new skill independently and spontaneously. This ensures that instructors do not underestimate the skills of AAC users and provide more prompting support than is required, thus pre-empting them from important opportunities for communication.

One potential disadvantage of a "least to most" prompting hierarchy is that it does allow the individual to make mistakes (Sigafoos, et al., 1991). Obviously, it is not a good idea to allow an individual to repeatedly practice an "incorrect" behavior. However, in the three investigations, procedures were in place to address this potential problem: Following any incorrect response by the individual who used AAC, the instructor implemented a model immediately, demonstrated the correct target skill, and encouraged the AAC user to imitate the model.

Fostering Generalization of New Skills

There were four techniques incorporated into the instructional procedures that are known to promote generalization: (1) vary the situations and partners when teaching a new skill; (2) use natural cues to signal opportunities to use the target skill during instruction; (3) vary the natural cues used; and, (4) use natural consequences in response to the target skill (Schlosser & Braun, 1994).

In the three investigations, the target skill was taught in at least 3-4 different situations with different partners, settings, and materials. Instructional sessions replicated interactions in the natural environment as much as possible. This was accomplished in one of two ways: either the skill was taught within actual interactions directly in the natural environment or the skill was taught within role plays that closely replicated circumstances in the natural environment. Implementing instruction in naturally occurring interactions in the real world ensures that the

individual is learning to respond to the actual cues that occur in the target situations. Implementing instruction in the natural environment offers a number of distinct advantages: it ensures the relevance of the skills targeted; it facilitates spontaneous and generalized use of the skills; and, it is familiar and immediate for individuals who have significant cognitive impairments. However, instruction in the natural environment can have several disadvantages also. Naturally occurring opportunities to use the target skill may occur infrequently for some skills so that the individual using AAC may have limited opportunity to practice, despite the need for repeated practice, especially in the early stages of learning.

Role plays of real world situations can be an effective technique to teach new communication skills (Calculator, 1988; Nietupski, Hamre-Nietupski, Clancy, & Veerhusen, 1986). Role plays provide opportunities for repeated practice of new skills under less stressful conditions. Role plays should always replicate the real world as closely as possible and should incorporate natural cues to mark the need or opportunity to use the target skill. These natural cues should be varied to reflect the variation that occurs in the real world (Light & Lindsay, 1991). Role plays should always be supplemented by actual practice in the real world to ensure that newly-learned skills are relevant and are generalized to use in the natural environment (Calculator, 1988; Nietupski et al., 1986). Instruction through a combination of role plays and real world practice offers advantages in terms of efficiency. However, some individuals who use AAC may have difficulty understanding the role plays and relating them to real world experiences. In these cases, instruction should be incorporated into naturally occurring opportunities in the individual's daily life.

In our research, instructors used role plays, in combination with practice in the natural environment, to teach individuals using AAC to use an introduction strategy (Investigation #6) and to ask partner-focused questions (Investigation #7) (Light & Binger, 1996b; Light, Binger, Agate, & Ramsay, 1996). The individuals learning these skills had already developed basic communication skills. They related easily to role plays. Therefore, role plays were used to enhance the efficiency of instruction; the role plays provided opportunities for repeated practice under minimally stressful conditions when first learning new skills. As the individuals developed their competencies using the new skills, instruction was combined with practice in the real world to promote generalization. On the other hand, in our research to teach the use of nonobligatory turns (Investigation #8), the instructors provided instruction primarily within real world interactions in the natural environment (Light, Binger, Bailey, & Millar, 1996). The individuals learning turn taking skills were at a basic level of communication; many had difficulty relating to

role play situations. Opportunities to take turns in social interactions occurred frequently throughout the day at home and school, so that it was easy to find opportunities for repeated practice learning these skills. Instruction always started in the situations that were least demanding (e.g., dyadic interactions with familiar adults); as the individuals who used AAC developed greater competence in using the new skills, they were introduced to more complex situations (e.g., interactions with peers or unfamiliar partners, group interactions).

As noted earlier, natural cues were always used to indicate the opportunity or need to use the target skill. Natural cues are cues that occur naturally within the real world; use of natural cues within instruction has been found to promote generalization (Sigafoos & York, 1991). Natural cues for a target skill vary from situation to situation and from partner to partner in the real world. If the same natural cue is used each time in instruction to signal an opportunity to use the target skill, then the individual who uses AAC may not recognize or respond appropriately to other natural cues that may occur in the real world (Light & Lindsay, 1991). Therefore, in the three investigations under Objective #2, the natural cues used in each instructional context were purposefully varied to promote generalization.

When the individual used the target skill during instructional sessions, the skill was reinforced with natural consequences such as those that would occur in the real world. Use of varied situations, natural cues, and natural consequences in instruction are all known to promote generalization of new communication skills (Sigafoos & York, 1991).

Fostering Maintenance of Skill Use

The instructional procedures for the three investigations fostered long term maintenance of skill use in three ways. First, each skill was taught to a high criterion during instruction and generalization in order to ensure mastery. Second, instruction focused on actual skill use in real world situations, providing the individual with repeated practice changing old patterns of performance and using the new skill. With repeated practice instituting new patterns of behavior in real life situations, the learner was less likely to revert to old routines once instruction was finished. Third, regular observations of the individual in the natural environment were conducted after instruction finished in order to monitor any decrease in the spontaneous use of the target skill so that remedial action could be undertaken immediately before further deterioration in performance was noted.

In summary, the instruction provided in all three investigations resulted in the successful, acquisition, generalization, and maintenance of new skills by a range of individuals who used AAC. Of special note is the fact that the three investigations all applied the same general model of instruction. The general instructional model was effective in teaching three very different social or strategic skills. This model holds promise as a general model of instruction to teach other social or strategic skills to individuals who use AAC as well.

Directions for Future Research

The three investigations under Objective #2 made a valuable contribution to the field by establishing the efficacy of the instructional procedures to teach three different skills to individuals who use AAC and to thereby further the communicative competence of these individuals. There are, however, a number of questions that remain unanswered and require future research. The three investigations replicated the instructional procedures across various individuals of different ages, with different skills and disabilities, who used different AAC systems. Future research should be conducted to establish the efficacy of the instructional procedures across an even broader range of individuals who use AAC, in order to further investigate the generality of the results. As noted earlier, the effectiveness of the general instructional model was successfully replicated across three investigations targeting quite different skills with various AAC users. Future research is required to adapt, implement, and evaluate this general instructional model to teach other social and strategic skills to individuals who use AAC.

The three investigations under Objective #2 established the efficacy of the instructional program as a package, but did not consider the impact of specific components of the instructional program. Future research should investigate the impact of various procedures within the general instructional model to identify the components necessary for successful outcomes and to determine if the instructional procedures can be streamlined, while still maintaining their effectiveness. For example, the pointing cue was used infrequently in the three investigations and may not be an essential element of instruction; the instructional procedures might be equally effective if they were simplified and used the following cuing hierarchy: natural cue, expectant delay, model.

While the instructional procedures resulted in successful acquisition, generalization, and maintenance of the target skills by almost all of the individuals who used AAC, there were two cases where participants required additional instruction to establish generalized, long term use of

the target skill (i.e., Subject 6, EB, in Investigation #7 to learn to ask partner-focused questions; and, Subject #5, DB, in Investigation #8 to learn to take nonobligatory turns in social interactions). Future research should investigate instructional procedures to further foster the generalization and maintenance of new skills by individuals who use AAC such as EB and DB.

While the three investigations clearly established the efficacy of the instructional procedures relative to a "no treatment" condition, the research did not compare the effectiveness of these procedures to other instructional approaches. Future research should investigate the relative effectiveness of various instructional programs to establish those that are most effective and to determine which AAC users benefit most from which types of programs. This future research should consider the impact of various factors in instructional design (e.g., the length and intensity of instructional sessions, the use of role plays to supplement instruction in the natural environment).

The three investigations under Objective #2 provided the first steps in identifying exemplary practices to develop the communicative competence of individuals who use AAC. Future research will elaborate these first steps and serve to enhance instructional programs to promote communicative competence with AAC users even further.

OBJECTIVE #3

To develop and evaluate 3 instructional modules describing the exemplary instructional practices (identified through Objective #2) to foster the communicative competence of individuals using AAC.

The purpose of this objective was to respond to the urgent need for appropriate instructional materials identified by speech language pathologists and teachers of individuals using AAC. Three short instructional modules were developed to serve as "how to" guides, describing instructional goals and procedures to foster the communicative competence of students using AAC. These modules were designed to be easily understood and immediately useable by practicing speech language pathologists, educators, and related professionals. Each of the modules was field tested at a minimum of five sites and revised based on the feedback from these sites.

Specific Research and Development Objectives

The specific objectives for the development and evaluation of the instructional modules were as follows:

1. To develop three instructional modules documenting procedures to teach skills to enhance the communicative competence of individuals who use AAC;
2. To evaluate the modules to ensure that their form and content was easily understood by speech language pathologists, teachers, and related professionals and that the instructional techniques were reliably implemented;
3. To evaluate the instructional modules to ensure that their implementation resulted in positive outcomes for the individuals who use AAC (i.e., successful acquisition, generalization, and maintenance of the target skills and improved communicative competence).

Development and Evaluation Plan

Development and evaluation of the instructional modules occurred in conjunction with the three investigations conducted under Objective #2. An iterative developmental model (based on Fagerburg, Parnes, & Shein, 1991, and Schumaker & Deshler, 1991) was employed to develop and evaluate each of the three instructional modules. The development involved four phases: definition, development, evaluation, and refinement phases.

Definition Phase

In the definition phase, the functional requirements for the instructional modules were identified according to the needs of the intended audience: practicing speech language pathologists, educators, and related professionals, as well as professionals in pre-service training. The functional requirements identified were as follows: (a) the target goals should be functional and should be empirically proven to contribute to the communicative competence of AAC users; (b) the instructional procedures should reflect exemplary practices in AAC and should be empirically proven to be effective; (c) the instructional model should be consumer-responsive; (d) information should be presented in a logical manner; (e) language should be easily understood by family members and by professionals from multiple disciplines with varying levels of expertise and experience in AAC; (f) data collection forms and feedback forms should be included to facilitate

implementation; (g) these forms should be easy to use; (h) examples should be provided to clarify general principles; and, (i) the instructional modules should be as concise as possible.

Development Phase

The definition statement was used to guide the development of the 3 instructional modules. The modules were developed following an iterative procedure: drafts of the modules were reviewed, revised based on the feedback from the review, re-reviewed, and revised again, if required, based on the outcome of the re-review. The modules for each of the investigations were developed in a sequential manner starting with the module to teach the use of an introduction strategy, then the module to teach the use of partner-focused questions, and finally the module to teach the use of nonobligatory turns to increase participation. The form and content of the modules was reviewed prior to implementation and field testing by the project staff, the expert Advisory Panel of leading professionals and consumers in AAC, practicing speech language pathologists, educators, and related professionals working with individuals using AAC, and pre-professionals involved in pre-service training in speech language pathology, special education, and other related professions. Feedback from the review process was collated to assist in making revisions to the form and content of the modules. The iterative development process ensured that the modules sent out for field evaluation were high quality and that they met the needs defined in the definition phase.

Evaluation Phase

Each of the 3 instructional modules was field tested at a minimum of five sites in Pennsylvania. The field testing occurred in conjunction with the investigations described under Objective #2. The goals of the field testing were to ensure: (a) that the form and content of the modules were easily understood by teachers, speech language pathologists, and related professionals; (b) that the instructional techniques were reliably implemented by professionals; and (c) that the implementation of the instructional procedures resulted in positive outcomes for the individuals using AAC. Evaluation protocols were completed by the speech language pathologists, educators, and related support personnel at each site to measure the effectiveness and practicality of the modules as instructional guides and to evaluate the appropriateness and usefulness of the content and form of the modules. Data on the procedural reliability of instructional implementation by on-site professionals, collected during the investigations for Objective #2, provided objective measures of the ease and reliability of implementation of the

instructional procedures. Data on the acquisition, generalization, and maintenance of skills, and the accompanying social validation data, collected during the investigations for Objective #2, provided objective measures of student outcomes.

Refinement Phase

Data from the evaluation phase were analyzed and used to guide final revisions to the 3 modules during the Refinement Phase. Final versions of the 3 modules were distributed to the expert Advisory Panel for their review.

Evaluation Results

Results of the evaluation of the instructional modules are reported in the following sections: data on procedural reliability; data on skill acquisition, generalization, and maintenance; social validation data; data from the instructors' evaluations of the modules; and, data from the final review by the expert Advisory Panel of leading professionals and consumers.

Each of the modules was implemented and field tested by at least 5 professionals. The professionals involved in the field testing included individuals from various disciplines, with diverse levels of training and experience in AAC. A total of 15 professionals were involved in the field testing. Two of these professionals were males (13%); the remaining 13 were females (87%). Ages of the professionals ranged from 22 to 50 (mean=33;6 years). Four of the instructors (27%) were pre-professionals who implemented the instruction under the supervision of a qualified professional; the remaining 11 (73%) were all qualified professionals. The majority of the instructors were speech language pathologists (n=11; 73%); however, the instructors also included educators (n=3, 20%) and a residential counselor (n=1). In the latter cases, the instructors implemented the program in consultation with a certified speech language pathologist. Experience varied across the field testers: their years of experience in AAC ranged from 1-20 (mean=5;6 years); the number of AAC users with whom they had worked ranged from 3-50.

Procedural Reliability

Procedural reliability data provided information on how accurately the instructors implemented the instructional procedures from the modules during the field testing. These data provided an objective measure of the clarity of the instructional modules, and of the ease of understanding and implementation of the instructional procedures. The mean procedural

reliability coefficient for all instructors across all three instructional modules was 95.2%, ranging from 93.9% for the module on nonobligatory turns to 96.9% for the module on use of an introduction strategy.

Acquisition, Generalization, and Maintenance of the Target Skill

The results of Investigations #6, #7, and #8 provide clear evidence of the effectiveness of the instructional modules as protocols to teach the three target skills. Outcomes were positive for all of the subjects who participated in these investigations; all subjects successfully acquired, generalized, and maintained the target skill. Furthermore, the social validation data presented earlier attest to the fact that the instructional modules documented interventions that were valued by the participants and the significant others in their lives, as well as by representatives of society generally who had no prior experience or training in AAC.

Instructors' Evaluations

Table 34 presents the results of the evaluation of the instructional modules by the field testers. The data clearly indicate high levels of satisfaction with the instructional modules. All instructors reported that they would use the modules again and that they would recommend the instructional program to others. Suggestions for improving the modules were collated and revisions were made based on the feedback.

Review by the Expert Advisory Panel

The revised versions of the modules were reviewed by the Advisory Panel of 5 experts in AAC (3 professionals and 2 consumers). Results of this review were extremely positive. All of the experts strongly agreed with the following statements: (a) The instructional goals and procedures are appropriate; (b) The information is clearly presented: (c) The data collection forms are helpful and easy to use; (d) The amount of detail is appropriate; and (e) The modules are easy to read. All items received ratings of 7 on a 7 point Likert-type scale with 1=strongly disagree and 7=strongly agree, except item e which received a mean rating of 6.7 on the 7 point scale. All of the expert reviewers reported that they would highly recommend that professionals use the modules to teach new communication skills to individuals who use AAC.

Table 34

Mean Instructors' Ratings for Each of the Instructional Modules

	Intro strategy	Partner-focused questions	Turn taking	Overall
1. The manual was easy to follow.	5.7(5-7)	5.9(5-6)	6.2(5-7)	5.9
2. The goals were clearly stated.	6.5(6-7)	6.6(6-7)	6.6(6-7)	6.6
3. The procedures were easy to implement.	5.5(5-7)	5.9(4-7)	6(5-7)	5.8
4. The program was effective.	6.3(6-7)	6.9(6-7)	6.8(6-7)	6.7
5. I would use this program again.	6.2(6-7)	6.9(6-7)	7	6.7
6. I would recommend that others use this program.	6.3(6-7)	6.9(6-7)	7	6.7

Note: Table presents mean ratings on a 7 point Likert-type scale, where 1 = strongly disagree and 7 = strongly agree. The range of ratings is presented in parentheses.

IMPACT OF THE COMMUNICATIVE COMPETENCE PROJECT

The Communicative Competence Project enhanced current understanding and educational practice for individuals who use AAC: by identifying skills that underlie communicative competence; by identifying exemplary practices to teach these skills; and by documenting the new knowledge for consumers who use AAC, families, educators, speech language pathologists, pre-service professionals, administrators, and researchers in a form that is readily useable. In general terms, the new empirically-based knowledge will result in improved communicative competence for students who use AAC. With improved communication skills, these students will be better able to participate in learning activities and educational evaluations. They will achieve greater access to vocational options and will attain fuller participation in mainstream society.

The immediate and long term impact of the Communicative Competence Project can be summarized as follows:

1. The more than 100 professionals who participated in the five investigations under Objective #1 increased their knowledge of skills that contribute to the communicative competence of individuals using AAC; these professionals are expected to implement this new knowledge in their work with individuals who use AAC, thus ensuring appropriate goals in their interventions.
2. The 150 adults and 150 adolescents (who had no prior experience in AAC) who participated in the five investigations under Objective #1 gained greater knowledge of people who use augmentative and alternative communication, thereby increasing general public awareness.
3. The 13 individuals who used AAC who participated in the three investigations under Objective #2 all acquired new skills through the instruction provided, and thereby increased their communicative competence.
4. The 15 on-site professionals who participated in the investigations under Objective #2 learned effective instructional procedures to teach new communication skills to individuals who use AAC, thereby improving instructional practices with the individuals using AAC in their classrooms and intervention programs.
5. Dissemination of the results from the five investigations under Objective #1 (i.e., the skills that contribute to communicative competence) has assisted, and will continue to assist, practicing speech language pathologists, educators, and other professionals in identifying appropriate instructional goals for individuals using AAC.

6. Dissemination of the results from the investigations under Objective #2 (i.e., the exemplary practices to teach the use of an introduction strategy, partner-focused questions, and nonobligatory turns) has assisted, and will continue to assist, practicing speech language pathologists, educators, and other professionals in identifying appropriate instructional techniques for students using AAC.
7. The instructional modules (Objective #3) have assisted, and will continue to assist, professionals in developing, implementing, and evaluating effective instructional programs for individuals who require AAC.
8. The instructional modules will also be used by faculty in preservice training programs and are thereby expected to impact on the future generation entering the professions of education, speech language pathology, and other related disciplines.
9. Dissemination of the results of the 8 investigations and of the instructional modules has supported, and will continue to support, consumers who use AAC and their families in identifying relevant goals to further communicative competence and in understanding effective instructional techniques to achieve these goals.

In addition to the impact on knowledge and educational practice with individuals who use AAC, the Communicative Competence Project also impacted researchers in AAC by extending their understanding of the communication process for persons with severe communication disabilities and by stimulating future research efforts. The project established appropriate methodologies, and developed valid and reliable measurement tools. The project also identified important questions that require investigation in future studies. Future research efforts should include: investigations of additional skills that contribute to communicative competence; investigations of the interactions between various skills that contribute to communicative competence and between various characteristics of AAC users and specific skills; studies of the perceptions of individuals who use AAC and their families; and, evaluation of the efficacy of the instructional procedures developed in this project as the means to teach other skills. Through the Communicative Competence Project and future research efforts, exemplary practices will be identified and implemented to further the communicative competence of individuals who use AAC. With improved communication skills, individuals who use AAC will be better able to achieve their full potential at home, at school, at work, and in the broader social community.

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Skills that may contribute to the communicative competence of students who use AAC

Skill	Reference
Linguistic Skills	
Grammatical completeness of messages (i.e., use of telegraphic messages vs. complete messages)	Bedrosian, Hoag, Calculator, and Molineau, 1992; Chun, 1988; Culp, 1987; Light, 1989; Mathinos, 1988; Reed, 1986.
Length of message (i.e., long vs. short messages).	Bedrosian, et al., 1992.
Complexity of message.	Bedrosian, et al., 1992; Culp, 1987; Dowden & Beukelman, 1988; Light, 1989
Use of correct forms in appropriate contexts.	Chun, 1988; Culp, 1987.
Use of correct morphology.	Chun, 1988.
Use of correct spelling.	Fatt, 1991; Beukelman & Yorkston, 1982; Goodenough Trepaigner, 1988; Harris, 1982.
Use of simple words.	Fatt, 1991.
Use of precise vocabulary.	Mathinos, 1988; Reed, 1986.
Use of diverse vocabulary.	Bedrosian, et al., 1991; Dowden & Beukelman, 1988; Light, 1989.
Use of appropriate vocabulary for context.	Chun, 1988; Gallagher & Prutting, 1983; Reichle, 1991.
Use of unique messages.	Beukelman & Yorkston, 1982; Culp, 1987; Dowden & Beukelman, 1988; Light, 1988.
Demonstrated knowledge of meaning of words.	Stabb, 1983.
Demonstrated knowledge of meaning of sentences.	Light, 1989; Mathinos, 1988; Reed, 1986.

Skills that may contribute to the communicative competence of students who use AAC

2

Linguistic Skills (continued)	
Demonstrated knowledge of the types of utterances that typically occur.	Stabb, 1983.
Operational Skills	
Rate of communication	Beukelman, 1991; Dowden & Beukelman, 1988; Beukelman & Yorkston, 1982; Buzolich, 1982,; Kangas, 1991; Light, 1989; Culp, 1987; Harris, 1982; Cook & Coleman, 1987.
Rate of message formulation.	Beukelman & Yorkston, 1982; Culp, 1987; Harris, 1982; Kangas, 1991.
Time required to access items.	Kangas, 1991.
Rate of message delivery.	Beukelman and Yorkston, 1982; Culp, 1987; Rowland, 1990.
Turn transfer time (i.e., pauses less than 3 sec. vs. those greater than 3 sec.)	Wieman, 1977; Wieman & Backlund, 1980.
Timing of message delivery.	Dowden & Beukelman, 1988; Kraat, 1985.
Maintenance of smooth flow of conversation.	Bedrosian, et al., 1992; Dowden & Beukelman, 1988; Gallagher & Prutting, 1983; Wieman, 1977.
Smoothness or fluency of expression.	Bedrosian, et al., 1991; Dowden & Beukelman, 1988; Reed, 1986.

Skills that may contribute to the communicative competence of students who use AAC

3

Operational Skills (continued)

Accuracy of message production.	Beukelman, 1991; Beukelman & Yorkston, 1982; Buzolich & Higginbotham, 1985; Culp, 1987; Dowden & Beukelman, 1988; Fatt, 1991; Light, 1989; Reed, 1986.
Intelligibility of messages.	Bedrosian, et al., 1992; Berns, 1990; Beukelman & Yorkston, 1982; Buzolich & Higginbotham, 1985; Gallagher & Prutting, 1983; Reed, 1986.
Use of audible messages.	Reed, 1986.
Control of message completion efforts (signal accurate or inaccurate guessing, signal the termination of guessing).	Beukelman & Yorkston, 1982.
Use of socially acceptable means of communication.	Higginbotham & Yoder, 1982.
Use of a variety of modes to communicate.	Calculator, 1988; Culp, 1987.

Skills that may contribute to the communicative competence of students who use AAC

4

Social Skills.

Sociolinguistic Skills

Turn taking skills.

Frequency of turn taking/active participation in the interaction.	Bedrosian, et al., 1992; Bryan, Donahue, Pearl & Strum, 1981; Buzolich & Higginbotham, 1985; Guralnick & Paul-Brown, 1989; Kraat, 1985; Light, 1988; Light, Dattilo, English, Gutierrez & Hartz, 1992; Prutting, 1982.
Reciprocity of turn taking.	Light, et al., 1992; Gallagher & Prutting, 1983; Reiser & Troost, 1986.
Ability to successfully claim speaking turn.	Buzolich & Higginbotham, 1985; Chun, 1988; Higginbotham & Yoder, 1982.
Ability to interrupt.	Chun, 1988.
Ability to indicate next turn.	Chun, D. M., 1988; Rubin, 1988; Higginbotham & Yoder, 1982; Light, et al., 1992, Harris, 1982, Gallagher & Prutting, 1983; Prutting, 1982; Light, 1989.
Ability to signal boundary in discourse.	Chun, 1988.
Ability to yield turn.	Higginbotham & Yoder, 1982.
Ability to limit interruptions/hold turn.	Higginbotham & Yoder, 1982; Wieman, 1977; Weiman & Backlund, 1980.

Skills that may contribute to the communicative competence of students who use AAC

5

Sociolinguistic Skills (Continued)

Discourse management

Ability to initiate a conversation.	Buzolich & Higginbotham, 1985; Culp, 1987; Kraat, 1985; Light, 1989; Audet & Hummel, 1990; Higginbotham & Yoder, 1982; Calculator & Dollaghan, 1982; Light, Datillo, English, Gutierrez, & Hartz, 1992; Harris, 1982; Cook & Coleman, 1987; Gallagher & Prutting, 1983; Calculator, 1988; Salisbury, et al., 1989; Mathinos, 1988.
Number of topic initiations.	Culp, 1987; Spitzberg, et al., 1990; Light, 1988; Salisbury, et al., 1989.
Diversity of topics selected.	Culp, 1987.
Appropriateness of topics selected.	Gallagher & Prutting, 1983; Light, 1989; Mathinos, 1988; Salisbury, Britzman & Kang, 1989.
Ability to maintain conversation.	Bryan, et al., 1981; Buzolich & Higginbotham, 1985; Culp, 1987; Gallagher & Prutting, 1983; Harris, 1982; Kraat, 1985; Light, 1988; Light, 1989; Light, et al., 1992. Peck, 1989; Prutting, 1982; Reed, 1986; Rubin, 1988; Spitzberg, et al., 1990.
Number of on-topic comments.	Mathinos, 1988.
Use of contingent utterances.	Gallagher & Prutting, 1983; Light, Rourke & Johnston, 1993.

Skills that may contribute to the communicative competence of students who use AAC

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Sociolinguistic Skills (Continued)

Number of topic expansions.	Calculator & Dollaghan, 1982; Culp, 1987.
Use of comments to extend conversation.	Buzolich, King & Barody, 1991.
Amount of information offered.	Bedrosian, et al., 1991; Light, et al., 1992.
Ability to change topic.	Buttorf & DePape, 1982; Calculator & Dollaghan, 1982; Gallagher & Prutting, 1983.
Use of turnabouts to respond to partner & then change topic.	Mathinos, 1988.
Time spent talking.	Cipani, 1988.
Ability to constrain a listener to reply.	Chun, 1988.
Ability to conclude a topic of conversation.	Chun, 1988; Light, 1989; Mathinos, 1988.
Ability to terminate a conversation.	Chun, 1988; Higginbotham & Yoder, 1982; Harris, 1982; Mathinos, 1988; Light, 1989.
Cohesion and coherence	
Relevance of comments.	Audet & Hummel, 1990.
Maintenance of story cohesion.	Audet & Hummel, 1990; Yoder & Calculator, 1991; Gallagher & Prutting, 1983.
Maintenance of temporal sequence of events.	Audet & Hummel, 1990.
Use of transitional words.	Fatt, 1991.

Skills that may contribute to the communicative competence of students who use AAC

7

Sociolinguistic Skills (Continued)

Coherence of conversation.	Gallagher & Prutting, 1983; Light, 1989.
Communicative functions	
Variety of communicative functions expressed. e.g., request information, make choices, agree/disagree, offer choices, offer assistance, apologize, introduce self and others, express emotion, express thanks, make excuses, make suggestions, request attention, protest, answer questions, direct attention, pretend, warn/signal emergencies, command, persuade, request assistance , request clarification, label, greet others, confirm, express needs & wants, provide information, state opinions, etc.	Beukelman & Yorkston, 1980; Culp, 1987; Gallagher & Prutting, 1983; Kraat, 1985; Light, 1989; Light, Collier & Parnes, 1985; etc.
Number of communicative functions expressed.	Holdgrafer, 1991; Gallagher & Prutting, 1983.
Demonstrated knowledge of the function of sentences.	Mathinos, 1988; Gallagher & Prutting, 1983.
Communication breakdown & resolution.	
Identification of communication breakdown.	Culp, 1987; Fishman, et al., 1985.

Skills that may contribute to the communicative competence of students who use AAC

8

Sociolinguistic Skills (Continued)	
Repetition of message when required.	Calculator & Delaney, 1986; Culp, 1987.
Change of mode of communication when required.	Beukelman & Garrett, 1988; Calculator & Delaney, 1986; Culp, 1987.
Revision of message when required.	Bedrosian, et al., 1992; Beukelman & Yorkston, 1980; Calculator, 1988; Calculator & Delaney, 1986; Culp, 1987; Fatt, 1991; Fishman, et al., 1985; Gallagher & Prutting, 1983; Guralnick & Paul-Brown, 1989; Kraat, 1985; Light, Collier & Parnes, 1985; Reed, 1986; Salisbury, Britzman & Kang, 1989.
Signal when appropriate or inappropriate guess has been made.	Beukelman & Yorkston, 1982.
Tolerance for ambiguity.	Wieman & Backlund, 1980.
Code switching.	
Selection of appropriate communication modes for partner.	Culp, 1987; Dowden & Beukelman, 1988; Light, 1988.
Adjust length of utterance to meet needs of listener.	Carson, Sharpness, Shultz, & McGhee, 1986.
Adjust complexity of utterance to meet needs of listener.	Carson, Sharpness, Shultz, & McGhee, 1986.
Adjust communication styles in different situations.	Gallagher & Prutting, 1983; Guralnick & Paul-Brown, 1989; Prutting, 1982.

Skills that may contribute to the communicative competence of students who use AAC

9

Sociolinguistic Skills (Continued)

Nonverbal behaviors

Use of appropriate facial expressions.	Stabb, 1983; Fatt, 1991; Rubin, 1988; Higginbotham & Yoder, 1982; Gallagher & Prutting, 1983.
Use of appropriate gestures, e.g., head nod, shake, pointing and other nonverbal signals.	Buzolich & Higginbotham, 1985; Higginbotham & Yoder, 1982; Prutting, 1982.
Establish appropriate proximity.	Higginbotham & Yoder, 1982; Martin & Hammer, 1989; Prutting, 1982; Prutting & Gallagher, 1983; Salisbury, Britzman, and Kang, 1989.
Adjust interaction posture for partner & context.	Wieman, & Backlund, 1980; Gallagher & Prutting, 1983.
Establish appropriate eye contact.	Culp, 1987; Cipani, 1988; Berler, Gross, & Drabman, 1982; Bornstein, Bellack, & Hersen, 1977; Bornstein, Bellack, & Hersen, 1980; Cipani, 1980, Matson, Kazdin, & Esveldt-Dawson, 1980; Tofte-Tipps, Mendonca, & Peach, 1982; Fatt, 1991; Martin & Hammer, 1989; Rubin, 1988; Higgenbotham & Yoder, 1992; Gallagher & Prutting, 1983; Calculator, 1988, Prutting, 1982, Salisbury, Britzman & Kang, 1989.

Skills that may contribute to the communicative competence of students who use AAC

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Sociolinguistic Skills (continued)

Paralinguistic features

Use of appropriate intonation.	Chun, 1988; Cipani, 1988; Gallagher & Prutting, 1983; Prutting, 1982.
Use of appropriate pitch.	Chun, 1988; Gallagher & Prutting, 1983.
Use of appropriate stress.	Chun, 1988; Gallagher & Prutting, 1983.
Maintain appropriate volume.	Cipani, 1988, Gallagher & Prutting, 1983.

Socio-relational Skills.

Pay attention to partner.	Bedrosian, et al., 1992; Martin & Hammer, 1989.
Listen carefully to partner.	Martin & Hammer, 1989.
Provide feedback to partner when he/she is speaking.	Blau, 1986; Buzolich & Higginbotham, 1985; Higginbotham & Yoder, 1982; Light, Collier, & Parnes, 1985.
Demonstrate interest in partner (be "other" oriented).	Light, 1988; Light, 1989; Reed, 1986; Wieman, 1977.
Select topics of mutual interest.	Martin & Hammer, 1989.
Display respect toward partner.	Wieman & Backlund, 1980.
Respond to partner's messages.	Culp, 1987; Light, 1988.
Be polite.	Chun, 1988.

Skills that may contribute to the communicative competence of students who use AAC

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Socio-relational Skills (continued)	
Express empathy toward partner.	Villaume & Cegala, 1988, Wieman, 1977; Wieman & Backlund, 1980; Reiser & Troost, 1986.
Express affiliation/support for partner.	Villaume & Cegala, 1988; Wieman, 1977; Reiser & Troost, 1986.
Take the perspective of the listener.	Mathinos, 1988; Prutting, 1982; Reed, 1986.
Talk about what you know.	Martin & Hammer, 1989.
Self disclosure	Wieman, 1977; Weiman & Backlund, 1980; Martin & Hammer, 1989.
Ability to be socially relaxed.	Wieman, 1977; Reiser & Troost, 1986.
Demonstrate self confidence.	Foon, 1986.
Strategic.	
Put partners at ease.	Light, 1988; Yorkston, Marriner, Farrier, & Beukelman, 1984.
Use humor.	Fatt, 1991; Martin & Hammer, 1989; Rubin, 1988; Higginbotham & Yoder, 1982.
Let the partner know what to do and what to expect.	Light, 1988; Light, 1989; Yorkston, et al., 1984.
Teach partner strategies to facilitate interaction.	Light et al., 1992.
Use acknowledgement tactic.	Collins & Blood, 1990.

What are the last 4 numbers in your phone number? _____

Circle: Male Female

Student using AAC: Damon Skill: A O T N G

Session: 1 2 Order: A B

Location: _____ Group: P NA EA

COMMUNICATIVE COMPETENCE SCALE

Please read carefully the following statement about Damon, the student who uses augmentative communication. Based on your observations of the videotape, please answer this question. Circle the number that indicates whether you agree with the statement or not. 1 indicates that you strongly disagree, 2 that you disagree, 3 that you neither agree nor disagree, 4 that you agree, and 5 that you strongly agree. Please circle **one and only one number** for this question; do not put your circle between the numbers. You can assume that the distance between each of the numbers is equal. Please answer the question even though you may feel uncertain about the best response.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. The student is a competent communicator	1	2	3	4	5

What are the last 4 numbers in your phone number? _____

Circle: Male Female

Student using AAC: Damon Skill: A O T G N

Session: 1 2 Order: A B

Location: _____ Group: P NA EA

COMMUNICATIVE COMPETENCE SCALE - DAMON

Please read carefully the following statements about Damon, the student who uses augmentative communication. Based on your observations of the videotape, please answer each question. Circle the number that indicates whether you agree with the statement or not. 1 indicates that you strongly disagree, 2 that you disagree, 3 that you neither agree nor disagree, 4 that you agree, and 5 that you strongly agree. Please circle **one and only one number** for each question; do not put your circle between the numbers. You can assume that the distance between each of the numbers is equal. Please **answer every question** even though you may feel uncertain about the best response.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
2. The student can cope in daily situations requiring communication	1	2	3	4	5
3. The student expresses needs and wants clearly	1	2	3	4	5
4. The student communicates well in social situations	1	2	3	4	5
5. The student shares information with others in an effective way	1	2	3	4	5
6. The student communicates with others in a polite manner	1	2	3	4	5
7. The student communicates well one on one	1	2	3	4	5

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
8. The student is effective communicating in a group of people	1	2	3	4	5
9. The student is successful communicating at school	1	2	3	4	5
10. The student communicates at home in a capable manner	1	2	3	4	5
11. The student communicates successfully with people he/she meets in the community	1	2	3	4	5
12. The student communicates successfully with familiar adults	1	2	3	4	5
13. The student is effective talking to unfamiliar adults	1	2	3	4	5
14. The student communicates well with other students who are the same age	1	2	3	4	5
15. The student talks at the right time in the conversation	1	2	3	4	5
16. The student says things that are appropriate to the situation	1	2	3	4	5

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
17. It is easy to understand the meaning of the student's messages	1	2	3	4	5
18. The student understands his/her partners	1	2	3	4	5
19. The student relates well to his/her partners	1	2	3	4	5
20. The student is at ease when talking to others	1	2	3	4	5
21. Communicating with this student is easy	1	2	3	4	5
22. People would feel comfortable communicating with this student	1	2	3	4	5
23. This student could communicate with anyone	1	2	3	4	5
24. I would feel comfortable talking with this student	1	2	3	4	5
25. This student has the skills to communicate effectively	1	2	3	4	5

Appendix C

Forced Choice Question - Bob

Group: P NA EA **Location:** _____

Order: A B **Last 4 Digits of Phone Number:** ____

Skill: O A T G N **Circle One:** Male Female

Please check ONE answer only.

_____ Bob was a more competent communicator in the first video I saw today.

_____ Bob was a more competent communicator in the second video I saw today.

_____ Bob was equally competent in the two videos.

Appendix D

HOW TO TEACH AN INTRODUCTION STRATEGY

QUESTIONS AND ANSWERS

What is an introduction strategy?

An introduction strategy is a strategy used by individuals who require AAC when meeting new people. There are two essential components to an introduction strategy. The individual using AAC provides the new partner with: 1) appropriate information about his or her means of communication; and 2) instructions on how the new partner can best communicate with the individual using AAC. In this manner, the new partner obtains necessary knowledge on how to interact with the individual who uses AAC, and the partner is put more at ease. The individual using AAC will usually greet the partner before using the introduction strategy; the individual may or may not give his/her name, depending upon the situation.

> *Example:* Tom, who uses AAC, meets a new student at school. He selects the following messages on his voice output communication aid, "Hi, my name is Tom Banks. I use this computer to talk to people. If you can't understand what I'm saying, you can read the screen on my computer."

> *Example:* Cathy, who uses AAC, orders from a fast food restaurant. She selects the following messages on her voice output communication aid, "Hi. This computer speaks for me. If you can't understand me, please ask me to repeat my message."

Why is an introduction strategy important?

Communication is a two way process. The success of any interaction depends on **both** participants. An introduction strategy is intended to provide new partners with the knowledge they require to interact more effectively with the AAC user. Three research studies were recently conducted to investigate the effect of using an introduction strategy on the communicative competence of AAC users as perceived by adults and adolescents with no prior experience in AAC and professionals with expertise in AAC (Light, Binger, Dilg, & Livelsberger, 1995). Results indicated that using an introduction strategy positively influenced the perceptions of the competence of the AAC users for all three groups of observers - adults and adolescents without prior experience in AAC and professionals with expertise in AAC.

When should somebody who uses AAC use an introduction strategy?

Individuals who use AAC should use an introduction strategy any time they meet someone new.

Examples:

- meeting a new student at school;
- meeting a new teacher or secretary at school;
- meeting new people in a club or activity;
- meeting new people at a party;
- meeting a potential employer at an job interview;
- talking to a clerk in a store; or
- talking to a cashier in a fast food restaurant.

Who would benefit from learning to use an introduction strategy?

School age children, adolescents, and adults who use AAC and meet new people at school, at work, or in the community are all potential candidates to learn to use an introduction strategy.

Learning this strategy would be a priority for children or adults who:

- are motivated to meet new people;
- have opportunities to meet new people;
- value these opportunities; and
- have the skills to interact independently with new partners.

Learning to use an introduction strategy is especially important for individuals who currently have difficulty communicating with unfamiliar partners.

What is the goal of the instructional program?

The goal of the instructional program is as follows:

> The individual who uses AAC will use an introduction strategy spontaneously when meeting new people in at least 80% of the opportunities that occur in the natural environment.

This goal may be individualized to reflect the needs of each person who uses AAC by specifying partners (for example, new teachers at school, salespeople at stores) and/or contexts (for example, when shopping, when talking to a community group). The criterion for determining success can also be specified to individual needs. Evaluation of the program should be based ultimately on the individual's performance in the natural environment. The overall goal of the program is to improve the individual's communicative effectiveness in the real world.

What results can I expect from following this program?

We evaluated the effectiveness of this instructional program in a research study using a single subject multiple baseline design replicated across five subjects (Light & Binger, 1996). The subjects ranged in age from 13 to 44 and had a variety of disabilities, including cerebral palsy, developmental disability, autism, and traumatic brain injury. The subjects had a wide range of motor, cognitive, and linguistic skills, and used a variety of AAC systems, including computer-based voice output systems, communication cards or books, natural speech, and gestures. Prior to instruction, these individuals did not use an introduction strategy; they experienced difficulties in their interactions with unfamiliar people. After instruction, all five subjects learned to use an introduction strategy successfully. They generalized to spontaneous use of an introduction strategy in both practiced situations and in new contexts within their daily lives. All five subjects continued to use an introduction strategy when meeting new people even after intervention ended.

How long will it take to teach individuals to use an introduction strategy?

The time required to teach the use of an introduction strategy will vary across AAC users, depending on their skills and on the frequency and duration of instruction. On average, it took the five individuals in our study approximately six 30-40 minute instructional sessions (with a range of 2 to 9 instructional sessions) to complete the program and learn to use an introduction strategy spontaneously when meeting new people in the natural environment (Light & Binger, 1996). Our research suggested that learning was facilitated greatly when the individuals using AAC had frequent instructional sessions (at least 2-3 times per week) with repeated opportunities to practice using an introduction strategy in each session (at least 10 opportunities per session).

STEPS TO THE INSTRUCTIONAL PROGRAM

The following is an overview of the steps in the instructional program to teach the use of an introduction strategy to someone who uses AAC. Each step is described in detail in the sections that follow. A summary of the instructional steps and procedures is provided at the end of the module.

Step 1 Complete baseline.

Assess the individual's use (or lack of use) of an introduction strategy in real world situations before you start instruction. Determine if instruction is warranted. If instruction is warranted, obtain the individual's commitment to learn to use an introduction strategy and the commitment of the significant others to support the instructional program. Give your commitment to teach the strategy, evaluate progress, and modify the instruction as required to ensure that it is effective.

Step 2 Select introductory messages.

Select appropriate introductory messages for the individual to use when meeting new people.

Step 3 Teach the individual to use an introduction strategy.

Teach the individual to use an introduction strategy by following a simple cuing hierarchy (natural cue, expectant delay, point, model).

Step 4 Observe in the natural environment in *practiced* situations.

Observe the individual meeting new people in the natural environment in the situations which the individual practiced successfully during instruction. Check that the individual has generalized use of an introduction strategy to real life interactions.

Step 5 Observe in the natural environment in *new* situations.

Observe the individual meeting new people in the natural environment in situations which the individual has **not** practiced previously during instruction. Check that the individual has generalized use of an introduction strategy to new situations.

Step 6 Evaluate outcomes.

Meet with the individual using AAC and his/her significant others, as appropriate, to evaluate the outcomes of the instructional program and to determine the impact of the instruction on the individual's effectiveness as a communicator.

Step 7 Complete maintenance checks.

Complete periodic checks in the natural environment after instruction has been completed to ensure that the individual continues to use an introduction strategy spontaneously when meeting new people.

STEP 1 - COMPLETE BASELINE

To complete baseline, first determine situations in which the individual using AAC will be meeting new people and will benefit from using an introduction strategy. Then observe the individual in several of these real world situations before you start instruction and assess the frequency with which he/she uses an appropriate introduction strategy when meeting new people. Based on your observations, determine if instruction is warranted.

Select situations

- Meet with the individual who uses AAC and/or the significant others in his/her life, as appropriate.

- Brainstorm and write down a list of new people the individual might meet and new situations in which he or she might participate. Consider people involved in all aspects of the individual's life (for example, clubs, school, work, community activities, shopping).

- Select 3 to 4 situations as priorities for instruction, considering the following:
  - situations in which the individual is experiencing the greatest difficulty communicating with unfamiliar people;
  - situations in which use of an introduction strategy will enhance functioning the most;
  - situations that will be the most motivating for the individual;
  - settings in which the individual will have the most frequent contact with new people;
  - situations in which the individual will have the greatest chance for success; and
  - situations that will be most practical for you, knowing that at least part of the instruction will occur in the natural environment.

Collect baseline data

- Observe the individual who uses AAC in the natural environment in at least 3-4 of the selected situations to see what he/she currently does when meeting new people.

- Do **not** cue or prompt the individual who uses AAC in any way (that is, do not give any suggestions about what the individual could say).

- Use the Baseline data sheet to record the individual's performance during these observations.
  - Circle **Y** (yes) if the individual uses an appropriate introduction strategy when meeting someone new; circle **N** (no) if the individual does not use an appropriate introduction strategy.
  - Record **Y** or **N every** time the individual meets someone new. For example, if

Mary, an individual who uses AAC, walks into McDonald's, she has the opportunity to use an introduction strategy **immediately** when she goes up to the counter to order her food. If Mary uses an appropriate introduction strategy, then you would record **Y** (yes). If she says and does nothing, or if she starts to order without using an introduction strategy, you would record **N** (no), since she did not use an introduction strategy when she first encountered someone new.

- In order to circle **Y** (yes), the individual must use a **full** introductory message that describes his/her means of communication **and** provides instructions for the partner to facilitate the interaction.

- Do not give any feedback to the individual who uses AAC on his/her use of an introduction strategy yet.

Review baseline data and decide if intervention is warranted

- If the individual is already using an introduction strategy more than 50% of the time when meeting new people in the natural environment, and if the introduction strategy is effective, you probably do **not** need to teach the individual this skill. Monitor the individual's use of an introduction strategy to ensure that this skill is mastered. Consider other skills that might be priorities for the individual using AAC instead.

- If the individual is **not** using an appropriate introduction strategy spontaneously at least 50% of the time when meeting new people in the natural environment, if he/she is experiencing difficulties communicating with new people, and if this skill is considered a priority, you should begin instruction.

Obtain commitments

- Meet with the individual who uses AAC and the significant others, as appropriate. Review the individual's performance during baseline. Explain what an introduction strategy is and why it is important to use an introduction strategy when meeting new people.

- Obtain the individual's commitment to learn to use an introduction strategy when meeting new people.

- Obtain the commitment of the significant others to support the individual in learning to use an introduction strategy.

- Give your commitment to teach the introduction strategy, evaluate progress, and adapt the instruction as required to ensure that it is effective.

- Go to **Step 2 - Select Introductory Messages.**

BASELINE
Introduction Strategy

Individual using AAC:_____
Observer:_____

- Complete observations of the individual meeting new people in at least 3-4 situations in the natural environment. Select a different situation and new partner for each observation and record the date, situation and partner in the space provided.
- Do *not* provide any cues; do *not* give the individual any feedback on his/her performance.
- Record the individual's performance in each situation, by circling the correct option (**Y** or **N**). Circle **Y** (yes), if the individual uses an appropriate introductory message (describing his/her means of communication **and** providing instructions for the partner) **spontaneously** when first meeting the new partner. Circle **N** (no) if the individual meets someone new and does not use an introduction strategy.
- Use the comment section to record specific observations of interest (for example, what the AAC user said or did, the partner's reaction).

Date	Situation & Partner	Circle	Comments
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____
____	_____	**Y N**	_____

STEP 2 - SELECT INTRODUCTORY MESSAGES

Determine appropriate introductory messages for the individual to use when meeting new people. Involve the individual who uses AAC and the significant others in his/her life when selecting messages. Consider the content and the wording for the introductory messages(s). Think about how the individual will communicate the message (for example, by means of a voice output communication aid, instructions on the front of a communication book, or a separate card with an introductory message).

Examples of introductory messages

- Jim, a man who uses natural speech and a voice output communication aid to communicate, has a card that he shows to new people with the following introductory message: "Hi. My name is Jim. I was in a serious car accident 15 years ago. I am able to understand everything you say to me. Please watch my mouth when I speak. Ask me to repeat anything you don't understand. I will spell words orally if you don't understand, or type the message out on my computer."

- John, a man who uses a voice output communication aid as his primary means to communicate, has this introductory message programmed into his computer-based system: "Hi. This computer helps me talk. If you don't understand me, you can look at the computer screen or ask me to repeat my message."

- Ann, a teenager who uses a communication book with words to communicate, has this introductory message on the cover of her communication book which she shows to unfamiliar people she meets: "Please read these instructions to learn how to communicate with me. Please stand on my right side when you talk to me; I see best on my right side. I understand everything, so just speak to me as you would to anyone else. I shake my head to say "no". I point to a card to say "yes". I communicate by pointing to words in this book with the knuckle of my right index finger. When I point to a word, please say the word and check with me to make sure you are right. It takes me a while to make a selection. Please wait patiently; give me lots of time. I have a reflex that is hard for me to control; it makes me open my mouth very wide. Don't worry if this happens. I'm not upset. I just need a few minutes to get back under control. Please wait patiently. Thanks a lot!"

- Mary, who uses a voice output communication aid, has the following introductory message programmed into her computer system: "This is my computer. I use it to communicate. I use my headpointer to point to the things I want to say. Please give me 30 seconds or so to respond to you. You can read my screen if you don't understand me."

- Becky, who uses some sign language and a voice output communication aid, has the following introductory message programmed into her computer: "Hi, I'm Becky. I understand what is said to me, so please speak normally. I use sign language to communicate sometimes. If you don't know sign language, just let me know and I will type the things I want to say on this computer. You will hear my message once I finish typing it out. Please give me a few minutes to answer. I may be slow, but it's worth waiting for!"

Determine Content

- Meet with the individual who uses AAC and/or the significant others. Review the interactions observed at baseline. Brainstorm to determine what information should be included in the introductory messages.

  The introductory message(s) should include:
  - a description of the individual's means of communication; and
  - instructions on how the new partner can best communicate with the individual.

  The introductory message will usually be accompanied by a greeting which may be formal (Hello) or informal (Hi). In some situations, the introductory message will also be accompanied by:
  - an attention-getting phrase;
  - a statement of the individual's name; and/or;
  - a statement of the purpose of the interaction.

  Some individuals may need only one introductory message; others may need more than one introductory message to meet the demands of different situations.

- Think about all the new partners and new situations. What type of information will the new partners need in order to communicate effectively with the individual who uses AAC? Consider the following issues:

  - What means does the individual use to communicate?

  Examples:
  - uses a head shake to indicate no;
  - looks up to indicate yes;
  - points to letters of the alphabet to spell out messages;
  - types out messages on a computer;
  - uses gestures and pantomime.

- How does the individual select messages?

Examples:

- points to line drawings in a book with his right thumb or left thumb;
- points to letters on an alphabet board with a head stick;
- points with her eyes to people, objects, or activities.

- What does the partner need to do in order to successfully communicate with the individual who uses AAC?

Examples:

- Give extra time.
- Look at the display on the computer for clarification.
- Move to a certain location (for example, the individual who uses AAC sees better on her right side).
- Repeat the individual's message to check for understanding.
- Try to guess or predict what the individual is saying, or alternatively, wait until he/she is finished formulating the message without trying to guess.

- Is an attention-getting message, a greeting, the individual's name, and/or the purpose of the interaction required in some situations? Consider including:

  - attention-getting message(s), such as "Excuse me";
  - greeting(s) (for example, hi or hello);
  - the individual's name (for example, the individual's full name for formal situations or nickname for very informal situations); and
  - the purpose of the interaction (for example, I'd like to introduce myself or I'd like to place an order).

  Remember that some situations will **not** require these components. For example, people usually do not give their name when they are talking to a sales clerk in a store or ordering food in a restaurant. However, they do use a greeting and may need an attention-getting message in these situations.

Determine Wording

- Determine the most appropriate wording for the message(s) with input from the individual who uses AAC and/or significant others. Consider:

  - the individual's age (for example, a 9 year old should sound like a 9 year old);
  - personality (for example, a teenager may want to include slang expressions);
  - cultural background (for example, individuals from different cultural backgrounds may use different expressions);

- level of understanding;
- formality or informality of the situation (for example, very proper wording may be required for an interview and less formal wording for meeting a friend's brother);
- amount of detail required (for example, less detail may be required for one-time only encounters; more detail may be required for people with whom the individual will have regular contact in the future);
- partner's level of understanding (for example, young children or partners with disabilities may not be able to understand complex instructions); and
- use of humor to help break the ice.

- Remember to avoid terminology that would not be understood by people who are unfamiliar with AAC (for example, the name of the AAC system and terms that are specific to AAC such as "scanning", "LCD").

Determine the Means of Communication

- Decide what means the individual will use to communicate the introductory message(s). The individual may use various means to communicate an introductory message: a voice output communication aid, or a communication card, book, or board. However, some means are **not** appropriate to communicate introductory messages(s). For example, sign language is not an appropriate way to communicate an introductory message because many new partners will not understand sign language.

- Be sure that the means selected are:
  - highly intelligible (someone who is unfamiliar and who has no prior experience with AAC must be able to understand the message easily);
  - efficient (the message must be communicated quickly so that the individual using AAC can move on to the main purpose of the interaction); and
  - socially appropriate (the means used should be socially acceptable to unfamiliar partners).

- The means used may vary across individuals. For example, Jim, a 35 year old man who had a head injury, used a small laminated card with a typed message to communicate his introductory message, whereas John, a 17 year old man with cerebral palsy, used a computer-based voice output communication aid with an intelligible speech synthesizer to communicate his message.

Determine the Organization of the Introductory Message(s)

- Decide how to organize the introductory message(s) within the individual's AAC system(s).
  - It may be best for the individual to be able to communicate the desired introductory message all at once including information on the means of

communication and strategies for the partner to facilitate interaction. Keeping all this information together will be most efficient.

- You may want to add attention-getting message(s), greeting(s), the individual's name, and the purpose of the interaction as separate messages since these components may not be required in all situations.
- Remember that the individual who uses AAC may require more than one introductory message (for example, a message for informal situations and one for formal situations; a message for brief encounters with a new partner, for example, a sales clerk, and one for new people who will be seen regularly in the future, for example, a new classmate).

- Add the message(s) to the individual's AAC system.
- Review the introductory message(s) with the individual who uses AAC.
- Let the individual practice selecting the messages.
- Now go to **Step 3 - Teach the Individual to Use an Introduction Strategy.**

STEP 3 - TEACH THE INTRODUCTION STRATEGY

The instructional procedures are described below in detail. A summary of the steps in the instructional program and the procedures for each of the steps is included at the end of the module for easy reference during instruction. This summary provides a quick way to keep track of exactly what you are doing and what you need to do next.

Remember to collect data on the individual's performance during each instructional session using the Instructional data sheet. The data you collect will allow you to evaluate the effectiveness of the instruction. You should expect to see that the person using AAC requires fewer cues as instruction progresses until he/she learns to use the introduction strategy spontaneously when meeting new people. If this does not occur, it may be necessary to modify the instructional procedures. It should be emphasized that instruction is most effective if it is focused and frequent. Our research suggests that individuals did best when instruction occurred at least 2-3 times a week with at least 8-10 opportunities to practice using an introduction strategy in each instructional session (Light & Binger, 1996).

Define the Goal

- Start instruction by defining the goal.

  The individual who uses AAC will use an introduction strategy spontaneously when meeting new people in at least 80% of the opportunities that occur in the real world.

- Individualize the goal as required by specifying the new partners and situations (for example when ordering at a fast food restaurant, asking for assistance at the library, meeting someone new at a party). Specify the target mode(s) of communication (for example, using a voice output communication aid, or an introductory message on a card). The criterion for determining success can be adapted to meet individual needs also.

Explain the Goal

- Explain the goal to the individual who uses AAC using language that he/she can understand easily. Explain that the individual will be learning to use an introductory message when he/she meets new people.

- Ask the individual to think of situations where he/she should use an introduction strategy. Give examples of situations from all aspects of the individual's daily life (home, school/work, community). Talk about the impact of using an introduction strategy and of not using an introduction strategy.

- Explain why it is important to use an introduction strategy when meeting new partners:
  - to provide new partners with the information they need to understand how the individual communicates;
  - to help new partners learn strategies to communicate with the individual more effectively;
  - to help make a good impression on new people; and
  - to help put new partners at ease in a new situation.

Demonstrate How to Use an Introduction Strategy

- If possible, let the individual watch another AAC user use an introduction strategy when meeting new people. If this is not possible, let the individual watch you engaged in several situations in which you use an introduction strategy when meeting new partners. You should use the introduction strategy on the individual's AAC system so that the AAC user can relate easily to the situation.

- If it is appropriate to do so, accompany the interaction with "think-aloud statements" explaining when and why you are using an introduction strategy.

  For example, you are walking into a music store.

You (think-aloud statement):	(I just entered the store and I need some help finding this new CD I want. I should go up to the salesperson and first explain how I will be communicating with her so that the conversation will go smoothly. Then I'll explain what I need).
You (via AAC):	Hi. I use this computer to talk. Please let me know if you don't understand. Please give me a few minutes to type out my messages.
Salesperson:	OK. What can I do for you?
You (via AAC):	I need some help finding a CD.

- You will find that "think-aloud" statements are most effective with individuals who are older and who have developed their meta-communicative skills, that is their ability to think and talk about communication. If the individual has not yet developed meta-communicative skills, you will still want to demonstrate how to use an introduction strategy, but omit the think-aloud statements. In our research, most of the individuals who were learning to use an introduction strategy had sufficiently well developed communication skills that they were able to understand and benefit from the use of think-aloud statements (Light & Binger, 1996).

- Emphasize the importance of using an introduction strategy when meeting new people:
  - to provide new partners with the information they need to understand how the individual communicates;
  - to help new partners learn strategies to communicate with the individual more effectively;
  - to help make a good impression on new people; and
  - to help put new partners at ease in a new situation.

Set Up Situations to Teach an Introduction Strategy

- Choose one situation identified in baseline as a priority. Start instruction with the situations that are least complex. As the individual becomes more proficient at using an introduction strategy, add more difficult situations to instruction.

- Provide instruction in the use of an introduction strategy:
  - during actual interactions in the natural environment; or
  - during a combination of role play activities and of practice in actual interactions in the natural environment.

Since most individuals who use AAC do not have frequent opportunities to meet new people each day, you will find that instruction is most effective if you combine role plays with real world practice. This combination of instruction in role plays and real world situations offers opportunities for repeated practice under less stressful conditions during the early stages of learning. In our research, we found that most individuals, who use AAC, who are meeting new people regularly in the community and need to learn how to use an introduction strategy, were able to understand role plays and relate them to their real world experiences (Light & Binger, 1996). We therefore made use of role plays in our instruction of these individuals in order to maximize the efficiency of the intervention; we accompanied practice during role plays with practice in real world interactions as well (Light & Binger, 1996). However, some individuals who use AAC may have difficulty understanding role plays. For these individuals, it will be more effective to teach the use of an introduction strategy during actual interactions when meeting new people in a variety of contexts in the natural environment. The instructional procedures described below can be used either in role plays or in real world situations.

Role plays

If you are using **role plays** for part of the instruction, start by introducing the role plays to the individual who uses AAC.

- Explain that the individual using AAC is going to practice using an introduction strategy when meeting new people. The individual who uses AAC will be him/herself; you will pretend to be the new partner and will also help by cuing the individual as necessary.

- Explain the purpose of the interaction. For example, the individual is going to get a haircut at the mall and is meeting the hairdresser for the first time. Tell the individual to say everything he/she thinks should be said to the hairdresser.

- Use props to enhance the role play. For example, you could use a menu and wear an apron if you are a waiter/waitress in a restaurant role play.

- Change personas whenever you start another role play situation. For example, during one role play, be pleasant and helpful; for another, be disinterested or even rude. This will give the individual using AAC experience with the range of possible communication partners he or she will encounter in the natural environment.

- BE REALISTIC in the role plays. For example:

  If you are playing a counter person in a fast food restaurant, you might say, "Next?" or you might make eye contact with the individual to indicate that it is his/her turn. However, you would not say, "Can you use your system to tell me what you want?", because this is not something a counter person would say.

- Remember that the individual should learn to use the introductory message spontaneously at the **first** opportunity when meeting someone new.

Natural environment

If you are providing instruction in the **natural environment**, accompany the individual using AAC into a situation in the natural environment where he/she will be meeting someone new.

- Accompany the individual into the real world situation and guide him/her in using an introduction strategy as required (see the next section on the cuing hierarchy).

- Remember to teach the individual to use an introduction strategy at the **first** opportunity when meeting someone new.

Provide Guided Practice

- During each instructional session, whether in role plays or in real life situations, use cues to help the individual learn to use an introduction strategy when meeting someone new. Always follow the same sequence of cues: natural cue; expectant delay; point; and model. A detailed description of the cuing procedures is provided below. A brief summary of the cuing procedures is provided with the Instructional data sheet.

- Always give the individual using AAC the opportunity to use an introduction strategy spontaneously following a natural cue. Provide more cuing support **only if necessary** by using an expectant delay, pointing, and/or modeling.

- Record the individual's performance during each instructional session using the Instructional Data Sheet. Record the individual's spontaneous use of an introduction strategy following a natural cue; keep track of the additional prompts you provide (expectant delay, point, model), if any.

Level 1: Natural Cue
For each trial, start with a **natural cue.** A natural cue is something that happens **naturally** that tells the individual using AAC that he/she should use an introduction strategy.

Examples:

In a fast food restaurant, Steve, who uses AAC, is at the front of the line; the counter person looks up and smiles. These are natural cues for Steve to use an introduction strategy and then order.

Julie, who uses AAC, is at a party. When someone approaches and says , "Hi, my name is Karen", these are natural cues for Julie to use an introduction strategy and then start a conversation.

Kelly, who uses AAC, is starting at a new school. When she enters her new class and sees her teacher, these are natural cues for her to use an introduction strategy and introduce herself.

If you are using role plays, remember to **vary the natural cues** you give to the individual to simulate the different types of natural cues experienced in the real world. Be careful not to provide more support than a new partner typically would provide in the real world.

- If the individual **uses an appropriate introduction strategy spontaneously** (that is, if he/she describes his/her means of communication and instructs the new partner) at the start of the interaction:
  - Circle "Natural Cue" on the Instructional data sheet.
  - Respond with **natural consequences** and complete the interaction. A *natural consequence* is something that happens naturally in the real world **after** someone says something. For example, after someone places an order at a fast food restaurant, the counter person says, "That'll be $3.18," and puts the food on a tray. These are the natural consequences of placing an order. Or, if someone sees a friend in the hall and says "hi", the friend typically returns the greeting and may start a conversation. These are the

natural consequences of saying "hi". If an individual uses an introduction strategy, the partner would probably nod or say, "OK" and then the interaction would continue. These are natural consequences of using an introduction strategy.
- Begin another instructional trial, using the same role play situation, but with **different** natural cues or using a **different** situation, providing appropriate natural cues. Or provide practice in another situation in the real world.

- If the individual takes a turn that is **incomplete, inappropriate, or unintelligible** after the natural cue (that is, if he or she says anything that is not a complete introductory message):
  - Briefly tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
  - Go directly to **Level 4: Model.**

- If the individual **says nothing** following the natural cue:
  - Go to **Level 2: Expectant delay.**
  - Do not say anything.

Level 2: Expectant Delay

If the individual says nothing after the natural cue, use an **expectant delay**. An expectant delay is a pronounced pause, indicating that something is expected from the individual. There are two essential elements to an expectant delay: 1) The instructor maintains extended eye contact with the individual using AAC with an expectant facial expression; and 2) The instructor **waits** an extended period of time. The pause time required will vary from individual to individual: some may require more time (for example, 40-50 seconds), others may require less time (for example, 5-10 seconds).

- If the individual **uses an appropriate introduction strategy** after the expectant delay:
  - Circle "Expectant Delay" on the Instructional data sheet.
  - Respond with natural consequences and complete the interaction.
  - Practice the **same** situation again, using the **same** natural cues.

- If the individual takes a turn that is **incomplete, inappropriate, or unintelligible** following the expectant delay:
  - Briefly tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
  - Go directly to **Level 4: Model.**

- If the individual **says nothing** after the expectant delay:
  - Go to **Level 3: Point.**
  - Do not say anything.

Level 3: Point

If the individual who uses AAC does not use an introduction strategy after the expectant delay, then **point** toward the individual or his/her AAC system(s) in a general manner (not directly at the introductory message), look at the individual, and wait for the individual to select the introductory message him/herself. The pause time required will vary from individual to individual: some may require more time (for example, 40-50 seconds); some may require less (for example, 5-10 seconds).

- If the individual **uses an appropriate introduction strategy** after the pointing cue:
  - Circle "Point" on the Instructional data sheet.
  - Respond with natural consequences and complete the interaction.
  - Practice the **same** situation again, using the **same** natural cues.

- If the individual takes a turn that is **inappropriate, incomplete, or unintelligible** after the pointing cue:
  - Briefly tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
  - Go to **Level 4: Model.**

- If the individual **says nothing** after the pointing cue:
  - Go to **Level 4: Model.**
  - Do not say anything.

Level 4: Model

If the individual who uses AAC takes a turn that is incorrect, incomplete, or unintelligible at any time or does not use an introduction strategy after the pointing cue, **model** the correct use of the introduction strategy. A model occurs when you select the introductory message(s) yourself, then look at the individual expectantly, and wait for the individual to select the introductory message him/herself. The pause time required will vary from individual to individual: some may require more time (for example, 40-50 seconds); some may require less (for example, 5-10 seconds).

- If the individual **uses an appropriate introduction strategy** after the model:
  - Circle "Model" on the Instructional data sheet.
  - Respond with natural consequences and complete the interaction.
  - Practice the **same** situation again, using the **same** natural cues.

- If the individual **does not say anything** after the initial model, or if he/she **takes a turn that is incorrect, incomplete, or unintelligible**:
  - Repeat **Level 4: Model** until the individual responds appropriately. You may use a short verbal cue such as "You do it," or "You try," or you may use physical guidance to help the individual select the introductory message.

Provide Feedback

- After **completing** each instructional session, give the individual specific feedback on his/her performance using language that he/she can understand easily.
- Highlight his/her spontaneous use of an introduction strategy when meeting new people.
- Provide specific feedback about problem areas.

Evaluate Progress

- After each instructional session, review the data that you collected on the Instructional Data Sheet and evaluate the individual's progress to date.
- Calculate how many times the individual used an appropriate introduction strategy spontaneously at the natural cue level during the instructional session.
- Compare the individual's performance during this instructional session to his/her performance in previous instructional sessions.
- Remember that you may see some variability in performance depending on factors such as the individual's health, attention, or mood on any given day. However, in general terms, you should expect to see increases in the percentage of opportunities where the individual spontaneously uses an appropriate introduction strategy at the natural cue level.
- If the individual's use of the introduction strategy is improving with instruction, then continue to practice until the individual is proficient.
- If the individual's use of the introduction strategy is not improving as expected, despite repeated instructional sessions, then you may need to brainstorm to identify the problem and then modify the instruction to ensure it is effective.
- Check with the individual who uses AAC and/or the significant others periodically, as appropriate, and assess their satisfaction with the instructional program as it progresses.

Practice Until Proficient

- Continue practicing until the individual who uses AAC is proficient using an introduction strategy when first meeting someone new.

- If the individual does not meet criterion (for example, if the individual uses an introduction strategy spontaneously less than 80% of the time at the natural cue level) in instructional sessions, then continue with instruction until this criterion is met.

- When the individual meets criterion (for example, when the individual uses an introduction strategy spontaneously at least 80% of the time at the natural cue level) in at least 4-5 different situations, during instructional sessions on two consecutive occasions, then go to **Step 4 - Observe the individual meeting new people in the natural environment in practiced situations**.

SUMMARY OF CUING PROCEDURES
Introduction Strategy

- Level 1: Provide **natural cues**.
  - If the individual spontaneously uses an appropriate introduction strategy, respond appropriately, and circle "Nat. cue" on the data sheet. Begin another trial with different natural cues, using either the same situation or a new situation.
  - If incorrect or incomplete, provide brief feedback (for example, "No, try this message") and go directly to level 4, **model**.
  - If individual says nothing, go to level 2, **expectant delay**. Do not say anything.

- Level 2: Use an **expectant delay**.
  - If the individual uses an appropriate introduction strategy following the expectant delay, respond appropriately, and circle "Exp. delay" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If incorrect or incomplete, provide brief feedback (for example, "Use this message") and go directly to level 4, **model**.
  - If individual says nothing following the expectant delay, go to level 3, **point**. Do not say anything.

- Level 3: **Point** toward the individual or his/her AAC system(s).
  - If the individual uses an appropriate introduction strategy following the point, respond appropriately, and circle "Point" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If incorrect or incomplete, provide brief feedback (for example, "Use this message") and go directly to level 4, **model**.
  - If individual says nothing following the point, go to level 4, **model**. Do not say anything.

- Level 4: **Model** the correct use of an introduction strategy.
  - If the individual uses an appropriate introduction strategy following the model, respond appropriately, and circle "Model" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If individual says nothing or if incorrect or incomplete following the initial model, **model** again and provide a brief verbal cue (for example, "Now you try."). Use physical guidance if necessary.

INSTRUCTION

Introduction strategy

Individual using AAC:______________________________
Instructor: ____________________________________

- Use the "Summary of Instructional Procedures" to remind you when to use which cues.
- Fill in the date and situation for each trial.
- Record the individual's performance on a new line each time he/she meets someone new.
- Circle the highest cuing level used (**natural cue, expectant delay, point, model**).
- Circle **"Nat. cue"** if the individual uses the full introduction strategy spontaneously following **natural cues**; circle **Exp delay, Point,** or **Model** if the individual requires these prompts.
- Remember, an introduction strategy must include **2** components to be correct: 1) description of means of communication; 2) instructions to partner.
- Record observations that are of interest under the comments section (for example, the partner's reaction).
- When the individual meets criterion in at least 4-5 different situations in 2 consecutive instructional sessions, go to **Step 4: Observe in the natural environment in *practiced* situations.**

Date	Situation	Circle the highest cue level				Comments
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________
____	________	Nat cue	Exp delay	Point	Model	________________

STEP 4 - OBSERVE IN THE NATURAL ENVIRONMENT IN *PRACTICED* SITUATIONS

Check to ensure that learning has generalized to the real situations which the individual has practiced successfully in instructional sessions.

- Remind the individual to think about the situations where he/she needs to use an introduction strategy.
- Emphasize the importance of using an introduction strategy when meeting new people.
- Observe the individual in the natural environment in an actual situation he/she has been practicing in instructional sessions. Go with the individual into the setting and observe what happens. Remember, **do not cue** the individual; just watch what happens. Do not specifically tell the individual that he/she is going to be meeting someone new and must use an introduction strategy; often we do not know when we will be meeting a new person.
- Check for:
  - Spontaneous use (did the individual use an appropriate introduction strategy spontaneously at the first opportunity when meeting someone new?); and
  - Effectiveness (did the partner have enough information from the introduction strategy to communicate effectively with the individual using AAC in the situation?).
- Give the individual feedback on his/her performance.
- Use the "Natural Environment Check" data sheet to record the individual's performance.
- If the individual **spontaneously uses an appropriate introduction strategy and is effective**:
  - Observe the individual in other situations previously practiced during instruction.
  - After the individual completes at least 2-3 practiced situations successfully, go to **Step 5 - Observe the Individual in the Natural Environment in New Situations.**
- If the individual **does not use an appropriate introduction strategy spontaneously** in these situations:
  - Try to determine where and why the individual experienced difficulty. For example, the new partner may have used natural cues not practiced in the instructional sessions.

- Return to **Step 3 - Teach the Use of an Introduction Strategy,** and change the instruction to address the difficulties the individual had in the natural environment. For example, if the new partner used natural cues not practiced in role plays, use more varied natural cues during instruction, including the ones used by the new partner in the natural environment. Provide additional instruction in real life situations with new partners.

- If the individual **uses an appropriate introduction strategy spontaneously, but is not effective**:
  - Try to determine why the introduction strategy was not effective. For example, the introductory message may not have contained enough information, it may have been unintelligible to the new partner, or it may have included confusing terminology.
  - If the introductory message itself is ineffective, make changes to improve the message, or create a new message for this particular situation. Follow the guidelines in **Step 2 - Select Introductory Messages**.
  - Observe the individual again in the natural environment in practiced situations to see if the changes you have made are effective.

NATURAL ENVIRONMENT CHECK
Introduction Strategy

Individual using AAC: _____
Instructor: _____

- Observe the individual who uses AAC in situations in the natural environment that he/she practiced during instruction. If the individual is successful, then observe the individual in new situations not practiced previously in instruction. Record the date and the situation. Indicate whether each situation is a "practiced" situation or a "new" situation.
- Record the individual's performance by circling the correct option (Y or N). Circle **Y** (yes) if the individual uses a full introduction strategy spontaneously at the first opportunity when he/she meets someone. Circle **N** (no) if he/she does not. Remember that a full introduction strategy includes two components: a description of the means of communication; and instructions to the partner to facilitate interaction.
- Use the comment section to record specific observations of interest. Indicate if the individual's use of an introduction strategy was effective or not; that is, did the partner have enough information to communicate effectively with the individual in the situation?

Date	Situation	Circle		Comments
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____
____	_____	Y	N	_____

STEP 5 - OBSERVE IN THE NATURAL ENVIRONMENT IN *NEW* SITUATIONS

Check to ensure that learning has generalized to real situations which the individual has **not** practiced previously during instruction.

- Once the individual is successful in the natural environment in at least 2-3 situations previously practiced during instruction, then observe the individual in situations that have **not** been practiced during instruction.
- Remind the individual of all the situations in which he/she needs to use an introduction strategy.
- Emphasize the importance of using an introduction strategy.
- Go with the individual into the setting and observe what he/she does. Do not cue the individual; just watch what happens. Observe at least 2-3 new situations.
- Check for:
  - Spontaneous use (did the individual use an appropriate introduction strategy at the first opportunity when meeting someone new?); and
  - Effectiveness (did the partner have enough information from the introductory message to communicate successfully with the individual using AAC?).
- Use the "Natural Environment" data sheet for data collection.
- Give the individual feedback on his/her performance.
- If the individual **uses an appropriate introduction strategy spontaneously in these situations and is effective**:
  - Celebrate the individual's success learning to use an introduction strategy! Discuss the impact of the introduction strategy when meeting new people.
  - Remember to complete **Step 6 - Evaluate Outcomes** and **Step 7 - Complete Maintenance Checks**.
- If the individual **does not use an appropriate introduction strategy** spontaneously in these situations:
  - Try to determine where and why the individual experienced difficulty. For example, the new partner may have used natural cues not practiced during instruction, or the individual may have had trouble generalizing use of the introduction strategy to new situations without first practicing them in instructional sessions.

- Return to **Step 3 - Teach the Use of an Introduction Strategy,** and change the instructional sessions to address the difficulties the individual had in the natural environment. For example, if the new partner used natural cues not practiced in instruction, use more varied natural cues during instruction, including the ones used by the new partner in the natural environment. If the individual seemed to have trouble generalizing the use of the introduction strategy to unpracticed situations, then practice in a wider variety of situations where the individual meets new people. Provide additional instruction with new partners in the natural environment.

- If the individual **uses an introduction strategy spontaneously, but is not effective**:
  - Try to determine why the introduction strategy was not effective. For example, the introductory message may not have contained enough information for the new partner and new situation. Or the introductory message may have contained terminology that the new partner did not understand.
  - If the introductory message itself is ineffective, make changes to improve the message, or create a new message for the individual to use for the situation in which the message was ineffective. Follow the guidelines in **Step 2 - Select Introductory Messages**.
  - Observe the individual again in the natural environment in new situations to see if the changes you have made are effective. If the changes are effective, then you are finished with instruction. Be sure to complete **Step 6 - Evaluate Outcomes** and **Step 7 - Complete Maintenance Checks**.

STEP 6 -EVALUATE OUTCOMES

As you complete the instruction, be sure to get feedback from the individual who uses AAC and the significant others in his/her life to evaluate the outcome of the instruction and ensure satisfaction with the program. Evaluation is a critical component to any instructional program. It determines the extent to which desired outcomes have been attained, as well as if there are any unexpected outcomes, either positive or negative.

- Ask for feedback on the impact of the instructional program from the individual who uses AAC and the significant others (for example, parent, teacher, residential counselor, spouse).

- Solicit feedback through questionnaires or rating scales or through more informal discussions. Ask the individual who uses AAC to complete the Consumer Feedback Questionnaire. Ask the significant others to complete the Partner Feedback Questionnaire. These forms provide examples of questionnaires that can be used to solicit feedback. You may prefer to develop your own feedback forms or to modify these forms to better meet your needs.

- Summarize the feedback, noting the strengths of the program and suggestions for improvement.

- Meet with everyone involved to discuss any problems identified and to develop specific action plans to resolve these problems. Identify the action that needs to be taken, the individuals responsible, and the time line for completion. Make sure the action plans are implemented and the outcomes are satisfactory.

- Use the feedback as a guide to improve the program and to plan future intervention with the individual who uses AAC and his/her significant others.

- Remember to complete **Step 7 - Complete Maintenance Checks** to ensure that the individual continues to use an appropriate introduction strategy spontaneously when meeting new people in the natural environment, even though formal instruction in this skill has ended.

CONSUMER FEEDBACK
Introduction strategy

Individual who uses AAC: _____
Date: _____

We are very interested in your feedback about the instruction you received in using an introduction strategy when meeting new people. Please answer the following questions. Add any additional comments in the space provided. Thank you.

1. Did the instruction help you to become a more effective communicator? ___ yes ___ no
   If yes, how? _____
   _____
   _____

   If no, why not? _____
   _____
   _____

2. What did you like **most** about the instruction?
   _____
   _____
   _____

3. What did you like **least** about the instruction?
   _____
   _____
   _____

4. Would you recommend that others participate in this instructional program?
   ___ yes ___ no
   If not, why not? _____
   _____
   _____

5. Do you have any other comments or suggestions about this instructional program?
   _____
   _____
   _____
   _____

PARTNER FEEDBACK
Introduction strategy

Individual who uses AAC: _____
Person completing this form: _____
Date: _____

As you know, _____ participated recently in an instructional program to teach him/her to use an introduction strategy when meeting new people. We are very interested in your feedback about this program. Please answer the following questions. Add any additional comments in the space provided. Thank you.

1. Did the instruction help _____ to become a more effective communicator?
___ yes ___ no
If yes, how? _____
_____
_____
If no, why not? _____
_____
_____

2. Would you recommend that others participate in this instructional program? ___ yes ___ no
If not, why not? _____
_____
_____

3. Do you have any other comments or suggestions about the program?
_____
_____
_____
_____

Thank you!

STEP 7 - COMPLETE MAINTENANCE CHECKS

After instruction is finished, complete periodic checks in the natural environment to ensure that the individual continues to use an introduction strategy when meeting new people even though formal instruction has ended.

- Two weeks after completing instruction, observe the individual, in several different situations, meeting someone new in the natural environment.
- Record the individual's spontaneous use of an introduction strategy and the success of the strategy, using the Natural Environment Check data sheet.
- If the individual does not use an introduction strategy spontaneously, return to **Step 3 - Teach the Use of an Introduction Strategy.**
- If the individual uses an introduction strategy spontaneously when meeting the new person and is successful, continue to observe the individual meeting new people at monthly intervals until you are sure that the individual will continue to use an introduction strategy spontaneously.
- Give the individual feedback on his/her performance. Celebrate his/her continued success using an introduction strategy when meeting new people!

SUMMARY OF THE INSTRUCTIONAL STEPS AND PROCEDURES

Introduction Strategy

Step 1 Complete Baseline

- Select situations where the individual needs to use an introduction strategy.
- Observe the individual in 3-4 situations and collect baseline data.
- Review the baseline data and decide if intervention is warranted.
- Obtain the commitment of the individual who uses AAC and of the significant others. Give your commitment to teach the introduction strategy.

Step 2 Select Introductory Message(s)

- Determine the content of the message(s), including a description of the individual's means of communication and instruction for the partner on ways to facilitate communication.
- Determine the most appropriate wording for the message(s).
- Decide what means the individual will use to communicate the introductory messages to new partners.

Step 3 Teach the Introduction Strategy

- Define the goal.
- Explain the importance of this goal.
- Demonstrate how to use an introduction strategy.
- Set up situations to teach an introduction strategy through a combination of role plays and practice in the natural environment.
- Provide guided practice in using an introduction strategy. Always start with a natural cue. Provide additional cuing support, that is, expectant delay, point, and/or model only as required (see the Summary of Cuing Procedures).
- Record the individual's performance on the Instructional Data Sheet.
- Provide feedback to the individual on his/her progress.
- Evaluate the individual's progress. Adapt the instruction if required.
- Practice until the individual is proficient.

Step 4 Observe in the Natural Environment in *Practiced* Situations

- Observe the individual, in the natural environment, meeting new people in situations that were practiced previously during instruction.
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of the introduction strategy and effectiveness of the strategy.
- If the individual does not use an introduction strategy spontaneously or is not effective, then adapt the message and/or the instruction as required.
- When the individual is successful in these situations, move on to Step 5 and observe the individual in the natural environment in new situations, not previously practiced during instruction.

Step 5 Observe in the Natural Environment in *New* Situations

- Observe the individual, in the natural environment, meeting new people in situations that were not previously practiced during instruction.
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of the introduction strategy and effectiveness of the strategy.
- If the individual does not use an introduction strategy spontaneously or is not effective, then adapt the message and/or the instruction as required.
- When the individual is successful in these new situations, celebrate the individual's success!

Step 6 Evaluate Outcomes

- Ask for feedback from the individual who uses AAC and the significant others on the instructional program.
- Develop specific action plans to address any problems reported.
- Use the feedback as a guide to improve instruction and to plan future intervention with the individual and the significant others.

Step 7 Complete Maintenance Checks

- Observe the individual, in the natural environment, meeting new people at regular intervals after instruction is completed (2 weeks, 1 month, 2 months after instruction).
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of the introduction strategy and effectiveness of the strategy.
- If the individual does not use an introduction strategy spontaneously or is not effective, then adapt the message and/or provide some more instruction as a refresher, as required.
- When the individual is successful in these situations, celebrate the individual's continued success using an introduction strategy!

Appendix E

PARTNER-FOCUSED QUESTIONS

QUESTIONS AND ANSWERS

What are partner-focused questions?

Partner-focused questions are questions that an individual asks his/her communication partners about their thoughts, feelings, and experiences (for example, "How are you?", "What did you do on the weekend?", "What's up?"). Questions that are not about the partner (for example, "What did she say?", "Can you get me a drink?") are not partner focused questions. When individuals who use AAC ask partner-focused questions, they show their partners that they are interested in them. Asking partner-focused questions fosters social closeness and enhances interaction. Asking partner-focused questions is an important component of mutually rewarding interactions.

Examples:

- Sam, who uses AAC, is talking to a friend at school on Monday morning. Sam uses his voice output communication aid to ask the friend, "How was your weekend?"

- Cindy, who uses AAC, and a friend are leaving the movie theater. The friend asks Cindy what she thought of the movie. She responds, "Great!" and then selects a partner-focused question on her communication board, "What do you think?"

- Diane, who uses AAC, notices her sister looks unhappy. Diane gestures and says, "What's the matter?"

Why are partner-focused questions important?

Asking partner-focused questions is a way for people who use AAC to engage communication partners in meaningful conversations that help foster positive social relationships. Three research studies were conducted to investigate the effect of asking partner-focused questions on the communicative competence of AAC users as perceived by adults with no prior experience in AAC, adolescents with no prior experience in AAC, and professionals with expertise in AAC (Light, Corbett, Gullapalli, & Lepkowski, 1995). Results indicated that both groups of adults, those with experience in AAC and those without prior experience in AAC, thought that the AAC users were more competent communicators when they asked partner-focused questions than when they did not. The adults valued partners who demonstrated an interest in others. It is interesting to note that asking partner-focused questions did not seem to influence the perceptions of the

adolescents, however. Adolescents may not yet have reached a stage in their development where they have learned to expect their partners to be oriented toward others. This research suggests that learning to ask partner-focused questions is an important goal for individuals who use AAC, especially when they are interacting with adult partners.

When should somebody who uses AAC ask partner-focused questions?

Individuals who use AAC may ask partner-focused questions during any type of social interaction, with familiar or unfamiliar partners. Individuals may use partner-focused questions as a way to initiate conversations with others. Or they may use partner-focused questions any time there is a pause in the interaction as a way to extend the conversation.

For example:

Brett, who uses AAC, is introduced to a new co-worker at his job and uses his voice output communication aid to say, "Hi, how are you?"

Lauren, who uses AAC, meets her teacher in the hall on Monday morning. Her teacher asks "How was your weekend?". Lauren answers the question and then selects the question, "How was yours?", in her communication book.

Several students gather after a quiz. Bob, who uses AAC, asks the others, "How'd you do?"

JoAnn, who uses AAC, meets a friend who is recovering from a cold. JoAnn initiates a conversation with her by asking, "How are you feeling?"

Erica, who uses AAC, tells a friend about her upcoming summer vacation, and then asks, "How about you? Where are you going?"

Who would benefit from learning to ask partner-focused questions?

Adolescents and adults who use AAC and who are interested in having social conversations with people at home, school, work, or in the community are potential candidates to learn to ask partner-focused questions. Learning this skill would be a priority for adolescents or adults who:

- have sufficient communication skills to understand and participate in basic social conversations;
- are motivated to engage in social conversations with others;
- value these opportunities;
- have difficulty initiating conversations with others; and/or
- tend to talk about themselves most of the time.

Learning to ask partner-focused questions would **not** be a priority for preschoolers or young children, since children this age would not be expected to have developed "other-orientation" skills yet.

What is the goal of the instructional program?

In general terms, the goal of the instructional program is as follows:

> The individual who uses AAC will spontaneously ask partner-focused questions in at least 80% of his/her available opportunities when engaged in social conversations with familiar and unfamiliar partners in the natural environment.

This goal may be individualized to reflect the needs of each person who uses AAC by specifying partners (for example, co-workers, family members, residential counselors) and/or contexts (for example, during coffee break, at dinner, after school). The criterion for determining success can also be individualized (for example, 80% of the available opportunities, or 85%).

What results can I expect from following this program?

A research study using a single subject design replicated across six subjects was conducted to determine the effectiveness of this instructional program to teach the use of partner-focused questions (Light, Binger, Agate, & Ramsay, 1996). The subjects ranged in age from 10 to 44 years old, and had a variety of disabilities, including cerebral palsy, mental retardation, and traumatic brain injury. They used various means of communication, including computer-based voice output communication aids, gestures, natural speech or speech approximations, and/or communication books of line drawings or words. Prior to instruction, these individuals asked partner-focused questions in less than 15% of the opportunities available to them. After instruction, all of the individuals learned to ask partner-focused questions spontaneously in at least 80% of the opportunities available to them. They successfully generalized use of partner-focused questions to their interactions in the real world and maintained their use of partner-focused questions after instruction ended.

How long will it take to teach individuals to ask partner-focused questions?

The time required to teach the use of partner-focused questions will vary depending on the skills of the AAC user and on the frequency and duration of instruction. It took the six individuals in our study an average of nine 30-60 minute instructional sessions (with a range of 4-16 instructional sessions) to complete the program and learn to ask partner-focused questions spontaneously in the natural environment (Light, Binger, Agate & Ramsay, 1996). Our research suggested that learning was facilitated greatly when the individuals using AAC had **frequent** instructional sessions (at least 2-3 times per week) with repeated opportunities to practice asking partner-focused questions in each session (at least 10 opportunities per session).

STEPS TO THE INSTRUCTIONAL PROGRAM

The following is an overview of the steps in the instructional program to teach partner-focused questions to someone who uses AAC. Each step is described in detail in the sections that follow. A summary of the instructional steps and procedures is provided at the end of this module.

Step 1 Complete baseline.

Assess the frequency with which the individual asks partner-focused questions currently by observing the individual in social interactions in the real world before you start instruction (take baseline measures). Determine if intervention is warranted. Obtain the individual's commitment to learn to ask partner-focused questions and the commitment of the significant others to support the instruction. Give your commitment to teach partner-focused questions and to monitor the effectiveness of the instruction.

Step 2 Select vocabulary.

Select appropriate partner-focused questions with the individual who uses AAC and the significant others, as appropriate.

Step 3 Teach partner-focused questions.

Teach the individual to ask partner-focused questions by following a simple cuing hierarchy (natural cue, expectant delay, point, model).

Step 4 Observe in the natural environment in *practiced* situations.

Observe the individual interacting with others in the natural environment in the social situations that were practiced during instruction. Check to ensure that learning has generalized to real life situations which the individual practiced successfully during instruction.

Step 5 Observe in the natural environment in *new* situations.

Observe the individual interacting with others in the natural environment in social situations that were **not** practiced previously during instruction. Check to ensure that learning has generalized to a full range of social situations.

Step 6 Evaluate outcomes.

Meet with the individual using AAC and his/her significant others to evaluate the instructional program and to determine the impact of the program on the individual's communicative competence.

Step 7 Complete maintenance checks.

Complete periodic checks in the natural environment, after instruction is completed, to ensure that the individual who uses AAC continues to ask partner-focused questions in a variety of social situations.

STEP 1 - COMPLETE BASELINE

To complete baseline, first determine situations in which the individual using AAC will be interacting socially with people and will benefit from asking partner-focused questions. Assess the frequency with which the individual currently asks partner-focused questions by observing several real world situations before you start instruction (take baseline measures). Based on your observations, determine if instruction is warranted.

Select situations

- Meet with the individual using AAC and significant others in his/her life, as appropriate.
- Brainstorm and write down a list of situations where the individual interacts with others socially. Consider situations from all aspects of the individual's life (for example, home, clubs, school, work, community activities).
- Think about situations where the individual would benefit from asking partner-focused questions.
- Select 3-4 situations where the individual does not typically ask partner-focused questions as starting points for instruction. Consider the following:
  - the situations in which the individual participates most frequently;
  - the situations that will be the most motivating for the individual;
  - the situations in which the use of partner-focused questions will enhance social functioning the most;
  - the situations in which the individual has the greatest opportunity for success; and
  - the situations that are most practical for you, knowing that at least part of the instruction will occur in the natural environment.
- Remember that selecting situations or topics which occur frequently with a wide range of partners may be the best starting point, even if the duration of the interactions is short. For example, discussions of weekend activities are usually fairly short conversations, but apply to many partners every Monday and Friday (discussing upcoming and past weekends).

Collect baseline data

- Observe the individual who uses AAC in the natural environment in the situations identified to determine if he/she currently asks partner-focused questions. Observe at least 10 possible opportunities to ask partner-focused questions in each of the different social situations.
- Do **not** cue or prompt the individual who uses AAC in any way (do not give any

suggestions about what the individual could say).

- Use the Baseline data sheet to record the individual's performance during these observations.
  - Circle **Y** (yes) if the individual asks a partner-focused question spontaneously when he/she has the opportunity to do so; circle **N** (no) if the individual does not ask a partner-focused question.
  - Record Y or N **every** time the individual has an opportunity to ask a partner-focused question. For example, Mary, who uses AAC, meets a friend and the friend says, "Hi. How was your weekend?" As soon as Mary answers the question about her weekend, she has the opportunity to ask her friend a partner-focused question such as "How was yours?" or "How was your weekend?" If Mary asks a partner-focused question at this opportunity, then you would record **Y** (yes). If Mary answers her friend's question and then waits for her friend to ask her another question, then you would record **N** (no) since Mary had the opportunity to ask a partner-focused question, but she did not do so.

- Do not give any feedback to the individual yet.

Review baseline data and decide if intervention is warranted

- If the individual is already asking partner-focused questions in at least 50% of his/her available opportunities in the natural environment, and if the partner-focused questions are effective, you do **not** need to teach the individual this skill. Monitor the individual's use of partner-focused questions to ensure that this skill is mastered. Consider teaching other skills that are priorities for the individual using AAC instead.

- If the individual is **not** asking partner-focused questions during at least 50% of his/her available opportunities in the natural environment, and if this skill is considered a priority, you should begin instruction.

Obtain commitments

- Meet with the individual who uses AAC and the significant others, as appropriate. Review the individual's performance at baseline. Explain what partner-focused questions are and why it is important to ask partner-focused questions during social interactions.

- Obtain the individual's commitment to learn to ask partner-focused questions.

- Obtain the commitment of the significant others to support the individual in learning this new skill.

- Give your commitment to teach partner-focused questions, to evaluate the effectiveness of

the instruction, and to make modifications to the instructional program if required.

- Go to **Step 2 - Select Vocabulary.**

BASELINE
Partner-focused Questions

Individual using AAC:_____
Observer: _____

- Observe the individual interacting in at least 3-4 social situations in the natural environment. Record the situation, the partner, and the date for each observation in the space provided. Observe at least 10 possible opportunities for the AAC user to ask partner-focused questions in each situation.
- Do *not* provide any cues. Do *not* give the individual any feedback on his/her performance.
- Record the individual's performance below, by circling the correct option (Y or N). Circle **Y** (yes) if the individual **spontaneously** asks an appropriate partner-focused question when he/she has an opportunity to do so. Circle **N** (no) if the individual has an opportunity to ask a partner-focused question and does not do so. Remember to record Y or N for **each** opportunity that the individual has to ask a partner-focused question.
- Use the comment section to record observations of interest (for example, the question asked, the partner's reaction, the effectiveness of the question).

Date	Situation & Partner	Circle		Comments
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____

STEP 2 - SELECT VOCABULARY

Identify appropriate vocabulary to enable the individual to ask partner-focused questions. Involve the individual who uses AAC and the significant others in his/her life when selecting the questions. Consider the content and wording for each question. Think about how the individual will communicate the question (for example, natural speech, communication book, voice output communication aid).

Examples of Partner-focused Questions

How are you?
How are you doing?
What's up?
How was your weekend?
How was yours?
How about you?
How did you like . . .?
What do you want to do?
What did you do last night?
What do you think?
What do you think about . . .?
What's wrong?
What's the matter?
What did you do?
What are you doing tonight?
What are you doing this weekend?
Do you have plans for the weekend?
What are you doing . . . ?
Where are you going on vacation?
When is your vacation?
How was your vacation?
How was your holiday?

Determine Content

- Meet with the individual who uses AAC and the significant others. Review the interactions at baseline. Brainstorm to determine the types of partner-focused questions the individual would need in these situations and others.

  Partner-focused questions include any question about the communication partner or his/her experiences.

- For individuals who seldom initiate interactions with others, consider questions which they can use to begin conversations and draw partners into interactions. For example, questions, such as "How are you doing?", "What's up?" or, "How was your weekend?", can all be used to begin a conversation with a familiar or unfamiliar partner.

- When first teaching individuals who use AAC to ask partner-focused questions, concentrate on a few general questions, such as "Hi, how are you?", "What are you doing this weekend", and "What's up?". These questions can be used in a variety of situations with different partners.

- As the AAC user develops competence in asking partner-focused questions, encourage the

use of questions with more specific and varied linguistic content as well. For example, an individual using AAC could ask a classmate, "How was your trip to your grandmother's?" or "How was your basketball game?" These questions demonstrate a specific interest in the partner's experiences.

- In some situations, it may be useful to include open-ended carrier phrases (for example, What are you doing . . . ?"). The individual can then fill in the specific information required for each situation. The use of carrier phrases may accelerate the rate of communication.

Determine Wording

- Determine the most appropriate wording for the partner-focused question(s) with the person who uses AAC and his/her significant others. Consider:
  - the individual's age (for example, a 16 year old should sound like a 16 year old);
  - personality (for example, some individuals may have favorite questions or expressions);
  - cultural background (for example, individuals from different cultural backgrounds may use different dialects or expressions);
  - the individual's level of comprehension (for example, some individuals may do best asking short, simple questions; others may use more complex forms);
  - the formality or informality of the situation (for example, proper wording may be required for a job interview and less formal wording for chatting with friends); and
  - the specificity of the questions required in the situation (see examples above).

Determine the Means of Communication

- Decide what means the individual will use to ask partner-focused questions. The individual may use various means, including natural speech, signs (if partners understand sign language), a communication board or book of photographs, line drawings, words, and/or the alphabet, or a voice output communication aid.

- Make sure that the means used are:
  - effective (that is, they communicate the message clearly to the partner);
  - efficient (that is, they communicate the message to the partner as quickly as possible); and
  - socially appropriate (that is, they communicate the message in a socially acceptable manner).

- The means used may vary across partners and situations. For example, in our research, Jim used natural speech to ask his mom routine partner-focused questions (for example, "How are you?", "What are you doing tonight?"), but he used his voice output communication aid to ask his friends specific partner-focused questions on the phone (for

example, "How was your trip to Florida?".

Add vocabulary to the AAC system

- If the individual is using an aided AAC system, decide how to organize the partner-focused questions on the individual's AAC system. Consider putting questions that are frequently-used on the system as whole messages. Consider using open-ended carrier phrases to accelerate communication of more specific partner-focused questions.
- Add vocabulary to the individual's aided AAC system(s) as required.
- Review the partner-focused questions with the individual who uses AAC and the way to communicate the questions. Let the individual practicing asking the questions.
- Now go to **Step 3 - Teach Partner-focused Questions**.

STEP 3 - TEACH PARTNER-FOCUSED QUESTIONS

The instructional procedures are described below in detail. A brief summary of the instructional steps and procedures is included. This summary provides an easy way to keep track of exactly what you are doing and what you need to do next.

Remember to collect data on the individual's performance during each instructional session using the Instructional Data Sheet. The data you collect will let you evaluate easily the individual's progress learning to ask partner-focused questions. You should expect to see that the individual requires less cuing as instruction progresses until he/she learns to ask partner-focused questions spontaneously. If this does not occur, it may be necessary to modify the instructional procedures.

It should be emphasized that instruction is most effective if it is focused and frequent. Our research suggested that individuals did best when instruction occurred at least 2-3 times a week with at least 10 opportunities to practice asking partner-focused questions in each instructional session (Light, Binger, Agate, & Ramsay, 1996).

Define the goal

- Start instruction by defining the goal of the program.

  > The individual using AAC will ask appropriate partner-focused questions spontaneously in at least 80% of the opportunities when engaged in social interactions with people (familiar and unfamiliar) in the natural environment.

- Individualize the goal as required by specifying targeted partners, topics, contexts, and/or modes of communication. The criterion for determining success can also be customized based on the individual's needs and skills. For example,

  > Matt will ask appropriate partner-focused questions spontaneously, using natural speech or his Dynavox, in at least 80% of the opportunities provided in social interactions at school with his homeroom teacher, physical education teacher, learning support teacher, principal, and secretaries in the school office before class, after class, at recess, and at lunch.

Explain the goal

- Explain the goal to the individual using language that is easily understood. Explain that the individual will be learning to ask partner-focused questions, that is, questions about the partner and his/her experiences.

- Ask the individual to think of situations where he/she should ask partner-focused

questions. Use examples from all aspects of the individual's daily life. Talk about the impact of asking partner-focused questions and of not asking these types of questions.

- Explain why it is important to ask partner-focused questions:
  - to demonstrate an interest in others;
  - to encourage others to interact with the individual who uses AAC; and
  - to enhance the communicative competence of the AAC user especially with familiar or unfamiliar adults.

Demonstrate how to ask partner-focused questions

- If possible, let the individual watch another AAC user engaging in social interactions and asking partner-focused questions.

- If this is not possible, let the individual watch you in several social situations in which you ask your partner questions about his/her experiences. Use an AAC system yourself during these demonstrations so that the AAC user can relate easily to the situation.

- If it is appropriate to do so, accompany the interaction with "think-aloud statements" explaining when and why you are using a partner-focused question.

For example, you are talking to a friend at work on Monday morning.

Your friend:	"Hi. How are you?"
You (via AAC system):	"Pretty good."
You (think-aloud statement):	*(My friend asked me a question. Now I should ask her one so that she knows I am interested in her.)*
You (via AAC system):	"How are you doing?"
Your friend:	"I'm feeling better, thanks. Did you have a good weekend?"
You (via AAC system):	"Great. We went to the beach."
You (think-aloud statement):	*(I told my friend about my weekend. Now I should ask her a question about her weekend so that she knows I am interested and so that she'll stay and talk a bit longer.)*

You (via AAC system):	"How was your weekend?"
Your friend:	"Busy. We were getting ready for our trip to Florida."

- You will probably find that "think-aloud statements" are most effective with individuals who are older and who have developed their meta-communicative skills, that is, their ability to talk about interactions. If the individual has not yet developed meta-communicative skills, you will still want to demonstrate how to ask partner-focused questions, but omit the think-aloud statements. Most of the individuals in our research on partner-focused questions were adolescents or adults who had developed their meta-communicative skills. Therefore, their instructors used think aloud statements within the demonstrations to explain when and why they were using partner-focused questions (Light, Binger, Agate, & Ramsay, 1996).

- Emphasize the importance of using partner-focused questions:
  - to demonstrate an interest in others;
  - to encourage others to interact with the individual who uses AAC; and
  - to enhance communicative competence.

Set up situations to learn to ask partner-focused questions

- Choose one situation identified in baseline as a priority. Start by practicing the situations that are the easiest. As the individual becomes more proficient at asking partner-focused questions, add more complex situations.

- Provide instruction in the use of partner-focused questions:
  - during actual social interactions in the natural environment; or
  - during a combination of role play activities and of practice in actual interactions in the natural environment.

  Instruction through a combination of role plays and real world practice offers advantages since it provides opportunities for repeated practice under less stressful conditions. In our research, the individuals who were learning to ask partner-focused questions were all able to understand role plays and relate them to real world experiences. We therefore made use of role plays in conjunction with practice in the real world in order to maximize the efficiency of the instruction (Light, Binger, Agate, & Ramsay, 1996). However, some individuals who use AAC may have difficulty understanding role plays and relating them to real world experiences. For these individuals, it will be more effective to teach the use of partner-focused questions during actual social interactions in a variety of contexts in the natural environment. The instructional procedures described can be used either in role plays, or in real world situations.

Role Plays

If you are using **role plays**, start by introducing the role plays to the individual who uses AAC.

- Explain that the individual who uses AAC is going to practice using partner-focused questions in various situations. The individual who uses AAC will be him/herself; you will pretend to be the partner and will also help by cuing the individual to ask partner-focused questions as necessary.

- Explain the purpose of the interaction. For example, the individual using AAC is arriving at school and sees her teacher in the hall.

- Use props to enhance the role play. For example, you could use a book bag and books if you are doing a role play of a conversation at school. Act out the situation exactly as it would occur in the real world.

- Practice each situation until the individual is proficient asking partner-focused questions in that situation. Then practice a new situation.

- Change personas whenever you change role play partners or topics. For example, during one role play, be very talkative, and for another, be shy. This will give the individual using AAC experience with the range of possible communication partners he or she will encounter in the natural environment.

- BE REALISTIC in the role plays. For example:

  If you are playing the role of a friend discussing the weekend's activities with the individual, you might say, "I had a great weekend". However, you would not say, "Use your AAC system to ask me about my weekend". This is not something a friend would typically say.

- Remember to teach the individual to ask partner-focused questions at **every possible opportunity.**

Natural Environment

If you are providing instruction in the **natural environment**, join the individual in the target social situation in the natural environment.

- Explain that you will help the individual to learn to ask partner-focused questions by providing guidance if he/she needs assistance.

- Join the individual in the real world situation and guide him/her in asking partner-focused questions, using the cuing hierarchy described in the next section.

- Remember to teach the individual to ask partner-focused questions at **every possible opportunity**. If a partner asks the individual who uses AAC a question, the individual should answer the question first. Then he/she has the opportunity to ask a partner-focused question as soon as the response is completed.

Provide Guided Practice

- During each instructional session, use cues to help the individual learn to ask partner-focused questions. Always follow the same sequence of cues: Natural cue, expectant delay, point, and model. A detailed description of the cuing procedures is provided below. A short summary is provided at the end of Step 3.

- Always give the individual using AAC the opportunity to ask a partner-focused question spontaneously following a natural cue. Provide more cuing support only if necessary by using an expectant delay, point, or model.

- Record the individual's performance during each instructional session using the Instructional data sheet. Record the individual's spontaneous use of partner-focused questions, following natural cues; keep track of the additional cues provided (expectant delay, point, model).

Level 1: Natural Cue
For each trial, start with a **natural cue.** A natural cue is something that happens naturally that tells the individual using AAC it is his/her turn to ask a partner-focused question.

Examples:

> When a friend says, "I can't wait until tonight", this is a natural cue for the person who uses AAC to ask a partner-focused question, "What are you doing?"
>
> At school on Monday morning, several students gather to talk. This is a natural cue for the individual using AAC to start a conversation by asking a partner-focused question such as, "What did you guys do this weekend?"

If you are using role plays, remember to **vary the natural cues** you give to the individual to simulate the different types of natural cues experienced in the real world. Be careful not to provide more support than a partner would actually provide in the real world.

- If the individual **asks an appropriate partner-focused question spontaneously** following the natural cue:
  - Circle "Natural Cue" on the Instructional data sheet.
  - Respond with **natural consequences** and continue the interaction. A

natural consequence is something that happens naturally in the real world **after** someone asks a partner-focused question. For example, when an individual who uses AAC says, "What did you do this weekend?", the natural consequence is for the partner to answer the question: "We went on a picnic and got rained on." The partner would **not** say, "That was a good question" or "Good talking"; these are not natural consequences.

- Continue the conversation until you have finished discussing the topic, using natural cues to indicate opportunities to ask partner-focused questions.
- Begin another instructional trial, using the same role play situation, but with **different** natural cues, or using a **new** situation, providing appropriate natural cues. Or provide practice in another situation in the real world.

- If the individual **asks an inappropriate partner-focused question or takes a turn that is not a partner-focused question** following the natural cue:
  - Tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message."
  - Go directly to **Level 4: Model.**

- If the individual says nothing following the natural cue:
  - Go to **Level 2: Expectant delay.**
  - Do not say anything.

Level 2: Expectant Delay

If the individual says nothing after the natural cue, use an **expectant delay**. An expectant delay is a pronounced pause, indicating that something is expected from the individual. There are two essential elements to an expectant delay: 1) The instructor maintains extended eye contact with the individual using AAC with an expectant facial expression; and 2) The instructor **waits**. The pause time required will vary from individual to individual: some may require a long pause (for example, 40-50 seconds); others may require less time (for example, 5-10 seconds).

- If the individual **asks an appropriate partner-focused question** after the expectant delay:
  - Circle "Expectant Delay" on the Instructional data sheet.
  - Respond with natural consequences by answering the question.
  - Continue the conversation until you have finished discussing the topic, using natural cues to indicate opportunities to ask partner-focused questions.
  - Practice the **same** situation again using the same natural cues.

- If the individual **asks an inappropriate partner-focused question or takes a turn that is not a partner-focused question** following the expectant delay:

- Tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
- Go directly to **Level 4: Model.**

- If the individual **says nothing** following the expectant delay:
  - Go to **Level 3: Point.**
  - Do not say anything.

Level 3: Point

If the individual who uses AAC does not ask a partner-focused question after the expectant delay, then **point** toward the individual or his/her AAC system(s) in a general manner (*not* directly at the partner-focused question), look at the individual, and wait for the individual to ask a partner-focused question. The pause time required will vary from individual to individual: some may require 40-50 seconds; others may require 5-10 seconds.

- If the individual **asks an appropriate partner-focused question** after the pointing cue:
  - Circle "Point" on the Instructional data sheet.
  - Respond with natural consequences by answering the question.
  - Continue the conversation until you have finished discussing the topic, using natural cues to indicate opportunities to ask partner-focused questions.
  - Practice the **same** situation again.

- If the individual **asks an inappropriate partner-focused question or takes a turn that is not a partner-focused question** following the pointing cue:
  - Tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
  - Go directly to **Level 4: Model.**

- If the individual **says nothing** following the pointing cue:
  - Go to **Level 4: Model.**
  - Do not say anything.

Level 4: Model

If the individual who uses AAC takes a turn that is incorrect or inappropriate at any time or does not ask a partner-focused question after the pointing cue, **model** the correct use of a partner-focused question. A model occurs when you demonstrate the correct use of a partner-focused question yourself using the individual's AAC system(s). After the model, look at the individual expectantly, and wait for the individual to produce the partner-focused question him/herself.

- If the individual **asks an appropriate partner-focused question** after the model:
  - Circle "Model" on the Instructional data sheet.
  - Respond with natural consequences by answering the question and continue the interaction.
  - Continue the conversation until you have finished discussing the topic, using natural cues to indicate opportunities to ask partner-focused questions.
  - Practice the **same** situation again.

- If the individual **does not say anything** after the initial model, or if he/she **takes a turn that is incorrect, inappropriate, or unintelligible**:
  - Repeat **Level 4: Model** until the individual responds appropriately. You may use a short verbal cue such as "You do it" or "You try", or you may use physical guidance to help the individual ask a partner-focused question.

Provide Feedback

- After completing each instructional situation, give the individual specific feedback on his/her performance.

- Highlight his/her spontaneous use of appropriate partner-focused questions.

- Provide specific feedback about problem areas.

Evaluate Progress

- After each instructional session, review the data that you collected on the Instructional data sheet and evaluate the individual's progress to date.

- Calculate how many times the individual asked partner-focused questions spontaneously at the natural cue level during the instructional session.

- Compare the individual's performance during this instructional session to his/her performance in previous instructional sessions.

- Remember that you may see some variability in performance depending on factors such as the individual's health, attention, or mood on any given day. However, in general terms, you should expect to see increases in the percentage of opportunities where the individual spontaneously asks an appropriate partner-focused question at the natural cue level.

- If the individual's use of partner-focused questions is improving with instruction, then continue to practice until the individual is proficient.

- If the individual's use of partner-focused questions is not increasing as expected, despite repeated instructional sessions, then you may need to brainstorm to identify the problem and then modify your instruction to ensure it is effective.

- Check with the individual who uses AAC and/or the significant others periodically and assess their satisfaction with the instructional program as it progresses.

Practice Until Proficient

- Continue practicing until the individual who uses AAC is proficient at asking partner-focused questions.

- When the individual asks partner-focused questions spontaneously at or above criterion level (for example, in at least 80% of the opportunities at the natural cue level) in at least 3-4 different situations, during two consecutive instructional sessions, then go to **Step 4: Observe in the natural environment in *practiced* situations.**

- If the individual does not meet criterion (for example, the individual asks partner-focused questions in less than 80% of the opportunities at the natural cue level), then continue instruction until the criterion is met.

Summary of Cuing Procedures
Partner-focused Questions

- Level 1: Provide **natural cues**.
  - If the individual spontaneously asks an appropriate partner-focused question following the natural cue, respond appropriately, and circle "Nat. cue" on the data sheet. Begin another trial with *different* natural cues, using either the same situation or a new situation.
  - If incorrect or inappropriate, provide brief feedback (for example, "No, try this message") and go directly to level 4, **model**.
  - If individual says nothing, go to level 2, **expectant delay**. Do not say anything.

- Level 2: Use an **expectant delay**.
  - If the individual asks an appropriate partner-focused question following the expectant delay, respond appropriately, and circle "Exp Delay" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If incorrect or inappropriate, provide brief feedback (for example, "Use this message") and go to level 4, **model**.
  - If individual says nothing following the expectant delay, go to level 3, **point**. Do not say anything.

- Level 3: **Point** toward the individual or his/her AAC system(s).
  - If the individual asks an appropriate partner-focused question following the point, respond appropriately, and circle "Point" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If incorrect or inappropriate, provide brief feedback (for example, "Use this message") and go directly to level 4, **model**.
  - If individual says nothing following the point, go to level 4, **model**. *Do not say anything.*

- Level 4: **Model** the correct use of an appropriate partner-focused question.
  - If the individual asks an appropriate partner-focused question following the model, respond appropriately, and circle "Model" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If individual says nothing, or if incorrect or inappropriate, **model** again and provide a brief verbal cue (for example, "Now you try."). Use physical guidance if necessary.

INSTRUCTION

Partner-focused Questions

Individual who uses AAC: ____________________

Instructor: ____________________

- Use the "Summary of Cuing Procedures" to remind you when to use which cues.
- Fill in the date, situation, and partner for each trial.
- Use a new line to record the individual's performance each time he/she has an opportunity to ask a partner-focused question. Circle the highest cuing level used (natural cue, expectant delay, point, model).
- Record observations that are of interest under the comment section (for example, the question asked, the partner's reaction).
- When the individual uses appropriate partner-focused questions at or above criterion level in at least 3-4 different situations, go to **Step 4: Observe in the natural environment in *practiced* situations.**

Date	Situation	Circle the highest cuing level				Comments
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________
______	__________	Nat cue	Exp delay	Point	Model	______________

STEP 4 - OBSERVE IN THE NATURAL ENVIRONMENT IN *PRACTICED* SITUATIONS

Check to ensure that the individual has generalized from the situations practiced successfully in instructional sessions to these same situations when they occcur in the real world.

- Remind the individual of the situations where he/she would benefit from using partner-focused questions.

- Emphasize the importance of asking partner-focused questions.

- Observe the individual in the natural environment in an actual situation he/she has been practicing in instructional sessions. Go with the individual into the setting and observe what happens. Remember, do not cue the individual; just watch what happens.

- Check for:
  - Spontaneous use (did the individual ask appropriate partner-focused questions spontaneously, without prompting?);
  - Effectiveness (was the partner-focused question successful?)

- Use the Natural Environment Check data sheet to record the individual's performance.

- Give the individual feedback on his/her performance.

- If the individual **asks appropriate partner-focused questions spontaneously and is effective**:
  - Observe the individual in other situations previously practiced during instruction.
  - After the individual completes at least 2-3 practiced situations successfully, go to **Step 5 - Observe in the Natural Environment in New Situations.**

- If the individual **does not ask appropriate partner-focused questions spontaneously** in these situations:
  - Try to determine where and why the individual experienced difficulty. For example, the partner may have used natural cues not practiced during instruction.
  - Return to **Step 3 - Teach Partner-Focused Questions,** and change the instruction to address the difficulties the individual had in the natural environment. For example, if the partner used natural cues not practiced during instruction, use more varied natural cues in instructional sessions, including the ones used by the new partner in the natural environment. Or provide additional instruction in actual situations in the natural environment.
  - In some situations, you may need to provide instruction for the partner to ensure the success of the interaction. Some partners may not expect the individual who uses AAC to ask partner-focused questions and may provide few, if any, opportunities to

do so.

- If the individual **asks partner-focused questions spontaneously, but is not effective**:
  - Try to determine why the partner-focused question was not effective. For example, the wording of the question may have been confusing, or the means of communication may not have been intelligible to the partner.
  - If the question and/or mode of communication require modification, make changes that you and the individual using AAC think will improve the effectiveness of the question. If necessary, add additional vocabulary to meet the needs of the situation. Follow the guidelines in **Step 2 - Select Vocabulary**.
  - Observe the individual again in the natural environment in practiced situations to see if the changes you have made are effective.

NATURAL ENVIRONMENT CHECK
Partner-Focused Questions

Individual using AAC:_____
Instructor:_____

- Observe the individual in situations in the real world that he/she practiced during instruction. If the individual is successful, then observe the individual in new situations.
- Record the date of each observation and the situation observed. Indicate whether each situation is a "practiced" situation or a "new" situation.
- Record the individual's performance by circling the correct option (**Y** or **N**). Circle **"Y"** (yes) if the individual spontaneously asks an appropriate partner-focused question when he/she has an opportunity to do so. Circle **"N"** (no) if the individual has an opportunity to ask a partner-focused question and does not do so.
- Record **Y** or **N** every time the individual has an opportunity to ask a partner-focused question. Start a new line for each opportunity to ask a partner-focused question.
- Use the comment section to record any specific comments of interest (for example, the question asked, the partner's reaction). Indicate if the individual's use of the partner-focused question was effective or not; that is, did the partner understand and respond?

Date	Situation	Circle		Comments
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____
_____	_____	Y	N	_____

STEP 5 - OBSERVE IN THE NATURAL ENVIRONMENT IN *NEW* SITUATIONS

Check to ensure that learning has generalized to real situations which the individual has **not** practiced previously during instruction.

- Once the individual is successful in the natural environment in at least 2-3 situations previously practiced during instruction, then observe the individual in situations that have **not** been practiced during instruction.

- Remind the individual of all the situations in which he/she should ask partner-focused questions.

- Emphasize the importance of asking partner-focused questions.

- Go with the individual into the setting and observe what he/she does. Do not cue the individual; just watch what happens. Observe at least 2-3 new situations.

- Check for:
  - Spontaneous use (did the individual use appropriate partner-focused questions spontaneously without prompting);
  - Effectiveness (was the partner-focused question successful?).

- Use the Natural Environment Check data sheet to record the individual's performance.

- Give the individual feedback on his/her performance.

- If the individual **asks appropriate partner-focused questions spontaneously in these situations and is effective**:
  - Celebrate the individual's success learning to ask partner-focused questions! Discuss the impact of asking partner-focused questions when interacting socially with others.
  - Please remember to complete **Step 6 - Evaluate Outcomes**, and **Step 7 - Complete Maintenance Checks**.

- If the individual **does not ask appropriate partner-focused questions spontaneously** in these situations:
  - Try to determine where and why the individual experienced difficulty. For example, the partner may have used natural cues not practiced during instruction, or the individual may have had trouble generalizing the use of partner-focused questions to new situations without first practicing them in instructional sessions.
  - Return to **Step 3 - Teach Partner-focused Questions,** and change the instructional sessions to address the difficulties the individual had in the natural environment. For example, if the partner used natural cues not practiced during instruction, use more

varied natural cues during instruction, including the ones used by the partner in the new situation in the natural environment. If the individual seemed to have trouble generalizing the use of appropriate partner-focused questions to unpracticed situations, then practice a wider variety of situations in role plays. Provide more frequent practice in real situations in the natural environment.

- In some situations, you may need to provide some instruction for the partner to ensure the success of the interaction. For example, the partner may not expect the individual who uses AAC to ask questions and may provide few opportunities, if any, to do so.

- If the individual **asks partner-focused questions, but is not effective**:
  - Try to determine why the questions were not effective.
  - Make changes to the questions or modes of communication to make them more effective. Add new questions, as required. Follow the guidelines in **Step 2 - Select Vocabulary**.
  - Observe the individual again in the natural environment in new situations to see if the changes you have made are effective. If the changes are effective, then you are finished with instruction. Be sure to complete **Step 6 - Evaluate Outcomes** and **Step 7 - Complete Maintenance Checks.**

STEP 6 - EVALUATE OUTCOMES

As you complete instruction, be sure to get feedback from the individual who uses AAC and the significant others in his/her life to evaluate the outcomes of the instruction and to ensure their satisfaction with the program.

- Ask for feedback from the individual who uses AAC and the significant others in his/her life (for example, parents, teacher, residential counselor, spouse).

- Solicit feedback through questionnaires or rating scales, or through more informal discussions. Ask the individual who uses AAC to complete the Consumer Feedback form. Ask the significant others to complete the Partner Feedback form. These forms provide examples of questionnaires that can be used to solicit feedback. You may prefer to develop your own feedback forms or to modify these forms to better meet your needs.

- Summarize the feedback, noting the strengths of the program and suggestions for improvements.

- Meet with everyone involved to discuss any problems identified and to develop specific action plans to address the problems. Identify the action that needs to be taken, the individuals responsible, and the time line for completion. Make sure the action plans are implemented and the outcomes are satisfactory.

- Use the feedback as a guide to improve instruction and to plan future intervention with the individual who uses AAC and his/her significant others.

- Remember to complete **Step 7 - Complete Maintenance Checks** to ensure that the individual continues to ask appropriate partner-focused questions spontaneously in the natural environment even though formal instruction in this skill has ended.

CONSUMER FEEDBACK
Partner-focused Questions

Individual who uses AAC: _____
Date: _____

We are very interested in your feedback about the instruction you received to learn how to ask partner-focused questions. Please answer the following questions. Add any additional comments in the space provided. Thank you.

1. Did the instruction help you to become a more effective communicator?
   _____yes_____no
   If yes, how?_____
   _____
   _____
   If no, why not?_____
   _____
   _____

2. What did you like **most** about the instruction?
   _____
   _____
   _____
   _____

3. What did you like **least** about the instruction?
   _____
   _____
   _____

4. Would you recommend that others participate in this instructional program?
   _____yes_____no
   If not, why not?_____
   _____
   _____

5. Do you have any other comments or suggestions about this instructional program?
   _____
   _____
   _____

PARTNER FEEDBACK
Partner-focused Questions

Individual who uses AAC: _____

Person completing the form: _____

Date: _____

As you know, _____ participated recently in an instructional program to teach him/her to ask partner-focused questions. We are very interested in your feedback about this program. Please answer the following questions. Add any additional comments in the space provided. Thank you.

1. Did the instruction help _____ to become a more effective communicator?_____yes_____no
   If yes, how?
   _____
   _____
   _____

   If no, why not?
   _____
   _____
   _____

2. Would you recommend that others participate in this instructional program?
   _____yes_____no
   If no, why not?_____
   _____
   _____

3. Do you have any other comments or suggestions about the program?
   _____
   _____
   _____

STEP 7 - COMPLETE MAINTENANCE CHECKS

After instruction is finished, complete periodic checks in the natural environment to ensure that the individual continues to ask partner-focused questions when interacting with people socially.

- Two weeks after completing instruction, observe the individual in several social situations in the natural environment. If the individual does not ask partner-focused questions spontaneously in these situations, return to **Step 3 - Teach Partner-focused Questions.**
- If the individual asks partner-focused questions spontaneously in these situations, continue to observe the individual interacting with others socially at monthly intervals until you are sure that the individual will continue to use partner-focused questions spontaneously when he/she has the opportunity.
- Remind the individual of the importance of asking partner-focused questions.
- Give the individual feedback on his/her performance. Celebrate his/her continued success asking partner-focused questions in social situations!

SUMMARY OF THE INSTRUCTIONAL STEPS AND PROCEDURES

Partner-focused Questions

Step 1 Complete Baseline

- Select situations where the individual interacts with others socially and would benefit from asking partner-focused questions.
- Observe the individual in 3-4 situations and collect baseline data on the Baseline data sheet.
- Review the baseline data and decide if intervention is warranted.
- Obtain the commitment of the individual who uses AAC to learn to ask partner-focused questions and of the significant others to support the instruction. Give your commitment to teach the individual how to ask partner-focused questions.

Step 2 Select Vocabulary

- Meet with the individual and the significant others, as appropriate.
- Determine the content and wording of partner-focused questions for the individual to ask in social situations.
- Decide what means the individual will use to communicate the partner-focused questions to partners.

Step 3 Teach Partner-focused Questions

- Define the goal.
- Explain the importance of this goal.
- Demonstrate how to ask partner-focused questions.
- Set up situations to teach the individual to ask partner-focused questions through a combination of role plays and practice in the natural environment.
- Provide guided practice in asking partner-focused questions. Always start with a natural cue. Provide additional cues, that is, expectant delay, point, and/or model only as required (see the Summary of Cuing Procedures).
- Record the individual's performance on the Instructional Data Sheet.
- Provide feedback to the individual on his/her progress.
- Evaluate the individual's progress. Adapt the instruction if required.
- Practice until the individual is proficient asking partner-focused questions.

Step 4 Observe in the Natural Environment in *Practiced* Situations

- Observe the individual, in the natural environment, interacting in social situations that were practiced previously during instruction.
- Collect data on the individual's performance using the Natural Environment Check data sheet. Record spontaneous use of appropriate partner-focused questions and the effectiveness of the questions.
- If the individual does not ask partner-focused questions spontaneously or is not effective, then revise the questions and/or modify the instruction as required.

- When the individual is successful in these situations, move on to Step 5 and observe the individual in the natural environment in new situations, not previously practiced.

Step 5 Observe in the Natural Environment in *New* Situations

- Observe the individual, in the natural environment, interacting in social situations that were not previously practiced during instruction.
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of partner-focused questions and the effectiveness of the questions.
- If the individual does not ask partner-focused questions spontaneously or is not effective, then adapt the questions and/or modify the instruction as required.
- When the individual is successful in these new situations, celebrate the individual's success!

Step 6 Evaluate Outcomes

- Ask for feedback from the individual who uses AAC and the significant others on the instructional program.
- Develop specific action plans to address any problems reported.
- Use the feedback as a guide to improve instruction and to plan future intervention with the individual and the significant others.

Step 7 Complete Maintenance Checks

- Observe the individual, in the natural environment, at regular intervals after instruction is completed (2 weeks, 1 month, 2 months after instruction).
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of partner-focused questions and the effectiveness of the questions.
- If the individual does not use partner-focused questions spontaneously or is not effective, then adapt the questions and/or provide more instruction as a refresher.
- When the individual is successful in these situations, celebrate the individual's continued success asking partner-focused questions!

Appendix F

INCREASING TURN TAKING

QUESTIONS AND ANSWERS

What is turn taking?

People participate in social interactions by taking turns. These turns may include spoken messages, signs or gestures, messages selected on a communication board or book, or output from a voice output communication aid. Sometimes an individual is obliged to take a turn in an interaction because the partner asks a question. For example, when a partner asks, "What happened to you?", the individual is obliged to answer. Turns that follow a partner's question are **obligatory turns**. Sometimes an individual is invited to take a turn in a conversation, but is not obligated to do so. For example, when a partner says, "I went to a great concert", the individual is invited to take a turn in response (for example, "Cool!"), but is not obligated to do so. Turns that follow a partner's comment or statement are **nonobligatory turns**.

Taking turns frequently in interactions, including those that are obligatory and those that are not obligatory, is one way to let partners know that you are interested and involved in the conversation and that you are a competent communicator.

When two people interact, they usually each take approximately equal numbers of turns. The turns include obligatory **and** nonobligatory turns. However, when individuals who use AAC interact with nondisabled partners, the turn taking is typically not balanced. The research shows that nondisabled partners usually dominate the interactions. The AAC users typically take fewer turns than their nondisabled partners (Light, Collier & Parnes, 1985; Light, Dattilo, English, Gutierrez, & Hartz, 1992). People who use AAC usually take their obligatory turns in interactions (those that follow a partner's question), but tend to forfeit all of their nonobligatory turns (those that follow a partner's comment or statement).

Why is it important to take nonobligatory turns?

Participating actively in interactions is one way that individuals who use AAC can let their partners know that they are interested and involved in the conversation. Three research studies were recently conducted to investigate the effect of the frequency of turn taking on the communicative competence of AAC users as perceived by adults and adolescents with no prior experience in AAC and professionals with expertise in AAC (Light, Gathercole, Greiner, Binger, & Corbett, 1995). Two AAC users were involved in the study: one of the AAC users, a male, used direct selection to control his computer-based AAC system and was able to communicate relatively efficiently in the interactions; the other AAC user, a female, utilized directed scanning to control her AAC system and was much slower taking turns in the interactions. Results suggested that all three groups of observers (adults with experience in AAC, adults without experience in

AAC, and peers without experience in AAC) felt that the male AAC user (who communicated at a relatively efficient rate) was a more competent communicator when he participated frequently in the interactions by taking obligatory turns **and** nonobligatory turns than when he participated less frequently, taking only his obligatory turns. The observers rated the communicative competence of the female AAC user (who had a slower communication rate) the same when she took turns frequently and when she did not. Their perceptions of her competence did not improve when she took more turns, perhaps because her turn taking rates were so slow. This study suggests that adults and adolescents value increased participation by AAC users, provided the turn taking does not take too much additional time. Therefore, learning to take nonobligatory turns is an important goal for individuals who use AAC who have relatively efficient rates of communication.

When should somebody who uses AAC take turns?

Individuals who use AAC should take all of their obligatory turns in their interactions (that is, they should take turns in response to their partners' questions). Individuals who use AAC and who have relatively efficient rates of communication should also be encouraged to take nonobligatory turns (that is, they should take turns following comments by their partners). They have the opportunity to take nonobligatory turns during any type of social interaction, any time their partner makes a comment.

Examples:

- A friend says, "I'm having a terrible day." Sarah, who uses AAC, gestures and vocalizes, "Oh no!" (a nonobligatory turn).
- A coworker says, "I went to a great concert last night."Andy, who uses AAC, selects, "Cool!" on his voice output communication aid (a nonobligatory turn).
- A neighbor catches a bug and shows it off, saying "I gotta spider!" Ann, a preschooler who uses AAC, says, "Yuck!" with her voice output communication aid (a nonobligatory turn).
- A classmate is talking about an exam and says "I got an A!". David, an individual who uses AAC, looks excited, nods, and vocalizes "Yeah!" (a nonobligatory turn).
- A residential counselor is preparing the weekly menu with some of the residents in a group home. She says, "Let's make pizza Friday night." Jane, who uses AAC, points to a picture on her communication board to communicate, "Awesome!" and gestures "high five".
- A mother is playing with blocks with her preschooler, Ben, who uses AAC. She puts another block on the tower and says, "The tower's going to fall". Ben vocalizes and selects the message, "Oh, oh!" on his voice output communication aid.

Who would benefit from learning to take nonobligatory turns?

People who use AAC who are currently fulfilling their obligatory turns in social conversations, but who tend to forfeit their nonobligatory turns are potential candidates to learn to take nonobligatory turns. This skill is especially appropriate as a goal for individuals who use AAC and who have relatively efficient rates of communication.

Learning this skill would be a priority for children or adults who:

- are motivated to engage in social conversations with others;
- value these opportunities;
- fulfill their obligatory turns currently (that is, respond to most of their partners' questions);
- do **not** fulfill their **nonobligatory** turns typically (that is, do not respond to their partners' statements or comments); and
- have relatively efficient rates of communication.

What is the goal of the instructional program?

The overall purpose of the instructional program is to encourage the individual who uses AAC to participate more frequently in interactions. The specific goal is as follows:

> The individual will take nonobligatory turns spontaneously during at least 80% of his/her available opportunities when engaged in social conversations with people (familiar and unfamiliar) in the natural environment.

This goal may be individualized to reflect the needs of each individual who uses AAC by specifying partners (for example, a parent at home, a teacher at school, a classmate, a residential counselor, a co-worker) and/or contexts (for example, during recess at school, during food preparation activities at home and at school, during coffee break at work, when looking at books or photo albums at home or school, during dinner at home). The criterion for determining success can also be specified to meet the individual's needs.

What results can I expect from following this program?

A research study using a single subject multiple baseline design replicated across five subjects was conducted to determine the effectiveness of this instructional program to increase turn taking with individuals who use AAC (Light, Binger, Bailey & Millar, 1996). The subjects ranged in age from 5 to 22 and had a variety of disabilities, including cerebral palsy, severe mental retardation, and autism. Subjects had a range of motor, cognitive, and linguistic skills. All of the individuals were at a basic level of communication development. They used various means to communicate, including natural speech, gestures and signs, communication books, and voice output communication aids. All of the individuals were relatively efficient communicators. Prior to instruction, these individuals participated infrequently in interactions. They fulfilled their nonobligatory turns in less than 20% of their available opportunities. All of the subjects learned

to take at least 80% of their nonobligatory turns spontaneously. They generalized these turn taking skills to new partners and tasks in the natural environment and maintained spontaneous turn taking more than two months after instruction.

How long will it take to teach individuals who use AAC to take nonobligatory turns?

The time required to teach someone to take nonobligatory turns will vary, depending on the learner's characteristics, and the frequency and duration of instruction. On average, it took the five individuals in our study approximately nine, 20-30 minute, instructional sessions (range of 7 to 16 sessions), that is, approximately 4-5 hours, to complete the program and learn to take at least 80% of their nonobligatory turns spontaneously in naturally occurring interactions (Light, Binger, Bailey, & Millar, 1995). Our research suggested that learning was facilitated greatly when the individuals using AAC had frequent instructional sessions (at least 2-3 times per week) with repeated opportunities to practice taking nonobligatory turns in each session (at least 10 opportunities per session).

STEPS TO THE INSTRUCTIONAL PROGRAM

The following is an overview of the steps in the instructional program to increase turn taking with someone who uses AAC. Each step is described in detail in the sections that follow. A summary of the instructional steps and procedures is provided at the end of the module.

Step 1 Complete baseline.

Assess the frequency with which the individual currently takes turns by observing the individual in social interactions in the real world before you start instruction. Does the individual using AAC take his/her obligatory turns (that is, those following a partner's question)? Does the individual using AAC take his/her nonobligatory turns (that is, those following a partner's comment)? Determine if instruction is warranted. If instruction is warranted, obtain the individual's commitment to learn to increase turn taking in social interactions and the commitment of the significant others to support the instructional program. Give your commitment to teach turn taking skills, evaluate the individual's progress, and modify the instructional program as required.

Step 2 Select vocabulary.

Select short messages to provide the individual with a way to take nonobligatory turns and to actively participate in conversations.

Step 3 Teach turn taking.

Teach the individual using AAC to take nonobligatory turns by following a simple cuing hierarchy (natural cue, expectant delay, point, model) during social interactions.

Step 4 Observe in the natural environment in *practiced* situations.

Check that the individual using AAC takes appropriate, nonobligatory turns spontaneously in the real life situations that he/she practiced during instruction.

Step 5 Observe in the natural environment in *new* situations.

Check to ensure that learning has generalized to real life situations which the individual has **not** practiced previously during instruction. Check that the individual using AAC takes appropriate, nonobligatory turns spontaneously in new situations, not practiced previously.

Step 6 Evaluate outcomes.

Meet with the individual who uses AAC and his/her significant others, as appropriate, to evaluate the outcomes of the instructional program and to determine the impact of the instruction on the individual's effectiveness as a communicator.

Step 7 Complete maintenance checks.

Complete periodic checks in the natural environment, after instruction has been completed, to ensure that the individual who uses AAC continues to take nonobligatory turns in a variety of social situations.

STEP 1 - COMPLETE BASELINE

Determine situations in which the individual using AAC will be interacting socially with people and will benefit from participating more actively in the conversation and taking nonobligatory turns as well as obligatory ones. Assess the frequency with which the individual currently takes nonobligatory turns by observing several real world situations **before** you start instruction (take baseline measures). Based on your observations, determine if instruction is warranted.

Select situations

- Meet with the individual using AAC and the significant others in his/her life, as appropriate.

- Brainstorm and write down a list of situations in which the individual interacts socially. Consider situations and partners from all areas of the individual's life (for example, home, clubs, school, work, community activities).

- Think about situations where the individual would benefit from taking nonobligatory turns and participating actively, but where he/she does not currently do so.

- Select 3 to 4 situations where the individual does not usually take nonobligatory turns as starting points for instruction, considering the following:
  - the situations that occur most frequently;
  - the situations that will be the most motivating for the individual;
  - the situations that offer the greatest payoff for the individual in terms of increased participation;
  - the situations in which the individual has the greatest opportunity for success; and
  - the situations that are most practical for you, knowing that at least part of the instruction will occur in the natural environment.

- For most individuals, selecting situations or topics which occur frequently with a wide range of partners may be the best place to start, even if the duration of the interactions is short. For example, in our research, we selected play situations and book reading situations with young children. With adolescents and adults, we used various situations such as food preparation activities, looking at magazines, photo albums, or cook books, playing games, looking at collections, and hanging out with peers.

Collect baseline data

- Observe the individual who uses AAC in the natural environment in at least 3-4 of the selected situations to see if he/she currently takes nonobligatory turns. Observe a total of at least 10 different opportunities to take nonobligatory turns in each situation.

- Do **not** cue or prompt the individual who uses AAC in any way (that is, do not give any suggestions about what the individual could say).

- Use the Baseline data sheet to record the individual's performance during these observations.
  - Circle **Y** (yes) if the individual takes a nonobligatory turn when he/she has the opportunity to do so; circle **N** (no) if the individual does not take a turn.
  - Record Y or N **every** time the individual has an opportunity to take a nonobligatory turn, that is, each time the partner makes a comment. For example, a friend is talking to Mary, an individual who uses AAC. The friend says, "I had such a great time water skiing yesterday." Mary now has the opportunity to take a nonobligatory turn **immediately** by nodding and smiling, by saying, "Great!", or through some other means. If Mary takes this nonobligatory turn, then you would record **Y** (yes). If she says and does nothing, then you would record **N** (no) since she did not take her nonobligatory turn, even though she had the opportunity to do so.

- Remember that individuals may use various means to take their nonobligatory turns: speech, head nods or gestures, a voice output communication aid, a communication board or book.

- Do not give any feedback to the individual about his/her turn taking yet.

Review baseline data and decide if intervention is warranted

- If the individual is already taking more than 50% of his/her available nonobligatory turns in the natural environment and if the nonobligatory turns are effective, you probably do **not** need to teach the individual this skill. Monitor the individual's turn taking skills to ensure that this skill is mastered. Consider other skills that might be priorities for the individual using AAC instead.

- If the individual is **not** taking at least 50% of his/her nonobligatory turns in the natural environment and if this skill is considered a priority, you should begin instruction to teach the individual using AAC to participate actively in conversations.

Obtain commitments

- Meet with the individual who uses AAC and the significant others, as appropriate. Review the individual's performance during baseline. Explain what nonobligatory turns are. Discuss why it is important to take these turns and to participate frequently in interactions.

- Obtain the individual's commitment to learn to take more turns in conversations.

- Obtain the commitment of the significant others to support the individual in learning to take more turns.

- Give your commitment to teach turn taking, evaluate the individual's progress, and adapt the instructional program if necessary to maximize learning.

- Go to **Step 2 - Select Vocabulary to Increase Turn Taking.**

BASELINE
Turn Taking

Individual using AAC: _____
Observer: _____

- Observe the individual talking to different people in at least 3-4 social situations. Record the date, situation, and partner in the space provided. Observe at least 10 possible opportunities for the AAC user to take nonobligatory turns in each situation.
- Do not provide any cues; do not give the individual any feedback on his/her performance.
- Record the individual's performance every time he/she has the opportunity to take a nonobligatory turn. Circle the correct option (**Y** or **N**). To circle **Y** (yes), the individual using AAC must **spontaneously** take an appropriate nonobligatory turn when he/she has the opportunity to do so. Circle **N** (no) if the individual has the opportunity to take a nonobligatory turn and does not do so. Remember an opportunity for a nonobligatory turn occurs **every time** the partner makes a comment and pauses.
- Use the comment section to record any specific observations of interest (for example, what the AAC user said or did; the partner's reaction).

Date	Situation	Circle	Comments
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____
_____	_____	**Y N**	_____

STEP 2 - SELECT VOCABULARY

Identify appropriate vocabulary to allow the individual to participate actively in conversations and to take nonobligatory turns. Involve the individual who uses AAC and the significant others in his/her life when selecting the vocabulary. Consider the content and wording for each message. Think about how the individual will communicate the message (for example, natural speech, gesture, communication book, voice output communication aid).

Examples of Messages to Fulfill Nonobligatory Turns

Yeah!	You're kidding?	That's great.
No way!	Hurray!	Alright!
Really?	Gross!	Oh no!
Cool.	Neat!	Yuk!
Awesome.	I doubt it.	Yes!
Poor thing.	Says who?	Yea!
OK.	Uh huh.	Head nod.
Wow!	Get out of here.	Thumbs up sign.
Fat chance!	Gimme a break.	Thumbs down sign.
Get a life!	Whatever!	Me, too!

Determine Content

- Meet with the individual who uses AAC and the significant others. Review the interactions observed at baseline. Brainstorm about vocabulary that the individual could use in these situations to fulfill nonobligatory turns and participate more frequently.

- When first teaching individuals who use AAC to take their nonobligatory turns in interactions, focus on turns that are quick to produce and minimally demanding from a linguistic point of view, but ones that communicate to the partner that the AAC user is actively involved in the conversation. Messages such as "Cool", "Yeah", Alright", "No way", meet these criteria. These are the types of messages that were used in the research study by Light, Binger, Corbett, Gathercole, Greiner, and Seich (1995). The use of these types of messages to fulfill nonobligatory turns positively influenced perceptions of communicative competence provided they were produced relatively quickly by the AAC user. As the AAC user develops his/her skills taking nonobligatory turns, you can encourage the use of messages with more specific and varied linguistic content as well.

- Individuals who are learning to take their nonobligatory turns will probably benefit from having a few general messages to express agreement, enthusiasm, disagreement, or dislike. These messages should be ones that they can produce quickly using gestures or speech or that they can retrieve quickly from their aided AAC systems. These general messages will save time and will also allow the individual to fulfill nonobligatory turns with a wide variety of partners in a wide variety of situations. For example, in our research, Jane, a 22

year old with cerebral palsy and severe mental retardation, learned to use the following messages to fulfill nonobligatory turns: "Awesome!" (communicated by pointing to a picture in her communication book), "high five" (communicated via gesture), "Hurray!" (communicated by a speech approximation and a gesture of her fist in the air), "yes" or "uh huh" (communicated via a head nod), and "Gross!" (communicated by pointing to a line drawing in her communication book).

Determine Wording

- Determine the most appropriate wording for the messages with the person who uses AAC and/or the significant others in his/her life, as appropriate. Consider:
  - the individual's age (for example, a 9 year old should use expressions that are appropriate for a 9 year old);
  - personality (for example, an individual may have a favorite expression);
  - cultural background (for example, individuals from different cultural backgrounds may use different dialects or expressions); and
  - the formality or informality of the situation (for example, proper wording may be required for an interview and slang may be used with friends).

Determine the Means of Communication

- Decide what means the individual will use to communicate each message.

- Remember that the individual who uses AAC may fulfill his/her nonobligatory turns via various means: speech or speech approximations, gestures (for example, head nod, thumbs up), a communication board or book, or a voice output communication aid. For example, in our research, Jane, a 22 year old with severe mental retardation, used speech approximations, gestures, and a communication book to fulfill her turns. Daniel, a 14 year old with autism, used natural speech, gestures, and a voice output communication aid.

- In selecting the means to communicate each turn, make sure that the means is:
  - effective (that is, it communicates the message clearly to the partner);
  - efficient (that is, it communicates the message in a relatively short amount of time); and
  - socially appropriate (that is, it communicates the message in a socially acceptable manner).

- Add messages to the individual's aided AAC system(s) as required. Review all of the turn taking vocabulary with the individual who uses AAC.

- Let the individual practice producing the messages.

- Now go to **Step 3 - Teach Turn Taking.**

STEP 3 - TEACH TURN TAKING

The instructional procedures are described in detail below. A brief summary of the instructional steps and procedures is included at the end of the module. This summary provides an easy way to keep track of exactly what you are doing and what you need to do next.

Remember to collect data during each instructional session using the Instructional data sheet. The data you collect will allow you to evaluate the effectiveness of the instruction and the individual's progress learning to take nonobligatory turns. You should expect to see that the person using AAC requires fewer cues as instruction progresses until he/she learns how to take nonobligatory turns spontaneously. If this does not occur, it may be necessary to modify the instructional procedures. It should be emphasized that instruction is most effective if it is focused and frequent. Our research suggests that individuals did best when instruction occurred at least 2-3 times a week with at least 10 opportunities to fulfill nonobligatory turns in each instructional session (Light, Binger, Bailey & Millar, 1996).

Define the Goal

- Start instruction by defining the goal:

  > The individual using AAC will participate more frequently in interactions. Specifically, he/she will take nonobligatory turns spontaneously during at least 80% of his/her available opportunities when engaged in social conversations with people (familiar and unfamiliar) in the natural environment.

- Individualize the goal by specifying partners and conversational situations. The targeted modes of communication can also be individualized. The criterion for determining success can be adapted to meet the individual's needs and skills as well. For example, in our research, the goal for Jane, a 22 year old woman with severe mental retardation, was individualized as follows:

  > *Jane will take her nonobligatory turns (that is, turns following her partners' comments) during at least 80% of her opportunities in one on one and small group interactions with her teacher, teacher's aide, classmates at school, house mates, and the residential counselors in her group home during activities such as food preparation, looking at photo albums, looking at magazines, looking at cook books, and arts and crafts activities.*

Explain the Goal

- Explain the goal to the individual, using language that he/she can understand easily. Explain that the individual will be learning to take more turns and participate more frequently in conversations.

- Explain that the individual should take a turn **every time** his/her partner says something. Talk about examples from the individual's daily life.

- Talk about what happens when the individual participates frequently in interactions and what happens when he/she does not. Explain why it is important to participate frequently in conversations:
  - to demonstrate an interest in others;
  - to be included more fully; and
  - to enhance the communicative competence of the AAC user.

Demonstrate How to Take Nonobligatory Turns

- If possible, let the individual watch another AAC user, who uses similar means to communicate, participating actively in social conversations by taking obligatory **and** nonobligatory turns.

- If this is not possible, let the individual watch you engaged in several social situations in which you take your nonobligatory turns (those following a partner's comment) as well as your obligatory ones (those following a partner's question). Use the individual's AAC systems yourself during these demonstrations so that the individual can relate easily to the situation.

- If it is appropriate to do so, accompany the interaction with "think-aloud statements" explaining when and why you are taking your turns. Focus specifically on the opportunities to take nonobligatory turns.

For example, you are talking to a friend at school on Monday morning.

Your friend:	"Hi. How are you?"
You (via AAC):	"Pretty good. How about you?"
Your friend:	"Not great. I've got a cold."
You (think-aloud statement):	*(My friend didn't ask me a question, but she told me she's not feeling well. I should say something quickly so that she knows I care.)*
You (via AAC):	"Oh no!" (nonobligatory turn)
Your friend:	"I guess it's just that time of year."

You (think-aloud statement):	*(Now I should say something again so that she knows I am interested and so that she'll stay and talk a bit longer.)*
You (via AAC):	"Yeah" (nonobligatory turn)
Your friend:	"How was your weekend?"
You (think-aloud statement):	*(My friend asked me a question. I need to answer it.)*
You (via AAC):	"Great. We went to the beach."
Your friend:	"Cool. I went to a great concert."
You (think-aloud statement):	*(My friend told me about the concert she went to. I should say something quickly so she knows that I'm interested).*
You (via AAC):	"Awesome." (nonobligatory turn)

- You will find that "think aloud statements" are most effective with individuals who are older and who have developed their meta-communicative skills. If the individual is a preschooler or has not yet developed meta-communicative skills, you will still want to demonstrate how to take nonobligatory turns, but omit the think aloud statements. In our research, most of the participants who used AAC were at a basic level of communication development. They had not developed meta-communicative skills. Therefore, we did not use think aloud statements; we simply demonstrated how to take turns after their partners' comments.

- Emphasize the importance of active participation and frequent turn taking:
  - to encourage others to interact with the individual who uses AAC;
  - to demonstrate an interest in others; and
  - to enhance communicative competence.

Set Up Situations to Teach Turn Taking

- Choose a couple of situations identified in baseline as priorities for increased turn taking. Opportunities for turn taking occur frequently throughout the day. Therefore, you will find many situations that occur in the natural environment when you can teach turn taking. Start with situations that are the least demanding and then move on to teach in more demanding situations as the individual develops competence in turn taking. For example, in our research, we started teaching Sarah, a 4 year old with cerebral palsy, to take her nonobligatory turns during one on one play situations with her teacher and aide at school

(playing blocks, house, cars). As she developed competence in these situations, we then moved on to teach her to take her nonobligatory turns in play situations with her peers and in small group interactions at circle time, during snack, and during arts and crafts activities.

- If necessary, you can supplement the instruction in these real world situations with role plays to provide additional practice in turn taking. However, many individuals who are learning to take nonobligatory turns are at a basic level of communication development and may have difficulty understanding role plays and relating them to their real world experiences. For these individuals, it will be more effective to teach turn taking during actual interactions in a variety of contexts in the natural environment. The instructional procedures described can be used either in role plays or in real world situations.

Natural Environment

When you are providing instruction in the **natural environment**, simply join the individual using AAC in a situation in the natural environment where he/she will be interacting socially and needs to learn to take more turns.

- Explain that you will help the individual learn to take nonobligatory turns by providing guidance if he/she needs assistance.

- Guide the individual in using nonobligatory turns as required (see the next section on the cuing hierarchy).

- Remember to teach the individual to take a turn **every** time the partner says something.

Role Plays

If you are using **role plays** for part of the instruction, start by introducing the role plays to the individual who uses AAC.

- Explain that the individual who uses AAC is going to practice taking turns in various situations. The individual who uses AAC will be him/herself; you will pretend to be the partner and will also help by cuing the individual as necessary. Explain the purpose of the interaction. For example, the individual is talking to a friend in the hall at school. They're talking about a new movie.

- Use props to enhance the role play. For example, you could use a back pack and books in a role play of a situation at school.

- Change personas whenever you start another role play. For example, during one role play, be very talkative, and for another, be shy. This will give the individual using AAC experience with the range of possible communication partners he or she will encounter in the natural environment.

- BE REALISTIC in the role plays. For example:

If you are pretending to be a friend, walking out of the theater after a movie, you might say, "Wow! What a great movie!" or maybe you wouldn't say anything. However, you would not say, "Now tell me with your AAC system what you thought about the movie"; this is not something a friend would typically say.

- Remember to teach the individual using AAC to take a turn at **every available opportunity.** Teach the individual to take a turn every time the partner says something.

Provide Guided Practice

- During each instructional session, use cues to help the individual learn to take nonobligatory turns. Always follow the same sequence of cues: natural cue, expectant delay, point, and model.

- Always give the individual using AAC the opportunity to take a nonobligatory turn spontaneously following a natural cue. Provide more cuing support **only if necessary** by using an expectant delay, pointing, or modeling. A detailed description of the cuing procedures is provided below; a brief summary is provided at the end of Step 3.

- Record the individual's performance during each instructional session using the Instructional Data sheet. Record the individual's spontaneous nonobligatory turns; keep track of the cues provided (expectant delay, point, model).

Level 1: Natural Cue
For each trial, start with a **natural cue.** A natural cue is something that happens naturally that tells the individual using AAC that he/she has an opportunity to say something. Opportunities for nonobligatory turns occur each time a partner makes a comment to the AAC user. For example,

> A friend says, "That was a great movie" and pauses, these are natural cues for Laura, who uses AAC, to take a nonobligatory turn such as "Yeah!"
>
> At work on Monday morning during a break, several people gather to talk. A co-worker says, "I'm having a terrible day." This is a natural cue for John, who uses AAC, to take a nonobligatory turn such as, "Oh no!"
>
> Sarah, who uses AAC, is playing with her dolls with her friend, Karen. Karen picks up the baby doll and says "Baby's hungry". These are natural cues for Sarah to take a nonobligatory turn such as "Oh oh!".

- If the individual **takes an appropriate nonobligatory turn spontaneously** following the natural cue:
  - Circle "Natural Cue" on the Instructional data sheet.

- Respond with **natural consequences** and continue the interaction. A *natural consequence* is something that happens in the real world **after** someone says something. For example, when a friend says, "That was a great movie!" and the individual who uses AAC says, Yeah!", the natural consequence is for the friend to talk more about the movie: "I loved the part where...". The friend would **not** say, "That was a good turn" or "Good talking"; these are not natural consequences.
- Continue the interaction with natural cues for the individual to take nonobligatory turns at each opportunity when the partner makes a comment.
- Begin another instructional trial, using the same situation with **different** natural cues or using a **different** situation, providing appropriate natural cues.

- If the individual takes a turn that is **incomplete, inappropriate, or unintelligible** after the natural cue:
  - Briefly tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
  - Go directly to **Level 4: Model.**

- If the individual **says nothing** following the natural cue:
  - Go to **Level 2: Expectant delay.**
  - Do not say anything.

Level 2: Expectant Delay

If the individual says nothing after the natural cue, use an **expectant delay**. An expectant delay is a pronounced pause, indicating that something is expected from the individual. There are two essential elements to an expectant delay: 1) The partner maintains extended eye contact with the individual using AAC with an expectant facial expression; and 2) The partner **waits**. The pause time required will vary from individual to individual: some may require more time (for example, 40-50 seconds); others may require less time (for example, 5-10 seconds).

- If the individual **takes an appropriate nonobligatory turn** after the expectant delay:
  - Circle "Expectant Delay" on the Instructional data sheet.
  - Respond with natural consequences and complete the interaction with natural cues for the individual to take nonobligatory turns at each opportunity, when the partner makes a comment.
  - Practice the **same** situation again, using the **same** natural cues.

- If the individual takes a turn that is **incomplete, inappropriate, or unintelligible** following the expectant delay:
  - Briefly tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").

- Go directly to **Level 4: Model.**

- If the individual **says nothing** after the expectant delay:
  - Go to **Level 3: Point.**
  - Do not say anything.

Level 3: Point

If the individual who uses AAC says nothing after the expectant delay, then **point** toward the individual or his/her AAC system(s) in a general manner (*not* directly at the target message), look at the individual, and wait for the individual to take a turn him/herself. The pause time required will vary from individual to individual: some may require more time (for example, 40-50 seconds); some may require less (for example, 5-10 seconds).

- If the individual **takes an appropriate nonobligatory turn** after the pointing cue:
  - Circle "Point" on the Instructional data sheet.
  - Respond with natural consequences and complete the interaction with natural cues for the individual to take nonobligatory turns at each opportunity when the partner makes a comment.
  - Practice the **same** situation again, using the **same** natural cues.

- If the individual takes a turn that is **incomplete, inappropriate, or unintelligible** after the point:
  - Briefly tell the individual his/her turn was incorrect (for example, "No, try this" or "Use this message").
  - Go to **Level 4: Model.**

- If the individual **says nothing** after the pointing cue:
  - Go to **Level 4: Model.**
  - Do not say anything.

Level 4: Model

If the individual who uses AAC takes a turn that is incorrect, incomplete, or unintelligible at any time or says nothing after the pointing cue, **model** the correct use of a nonobligatory turn. A model occurs when you demonstrate a nonobligatory turn yourself using the individual's AAC systems, then look at the individual expectantly, and wait for the individual to take a nonobligatory turn him/herself. The pause time required will vary from individual to individual: some may require more time (for example, 40-50 seconds); some may require less time (for example, 5-10 seconds).

- If the individual **takes an appropriate nonobligatory turn** after the model:
  - Circle "Model" on the Instructional data sheet.
  - Respond with natural consequences and continue the interaction with natural cues for the individual to take nonobligatory turns at each opportunity when the partner makes a comment.
  - Practice the **same** situation again, using the **same** natural cues.

- If the individual **does not say anything** after the initial model, or if he/she takes a turn that is **incomplete, inappropriate, or unintelligible**:
  - Repeat **Level 4: Model** until the individual responds appropriately. You may use a short verbal cue such as "You do it" or "You try", or you may use physical guidance to help the individual produce an appropriate nonobligatory turn.

Provide Feedback

- After completing each instructional session, give the individual using AAC specific feedback on his/her performance.
- Highlight times when he/she took appropriate nonobligatory turns spontaneously.
- Provide specific feedback about problem areas.

Evaluate Progress

- After each instructional session, review the data that you collected on the Instructional Data Sheet and evaluate the individual's progress to date.
- Calculate how many times the individual took appropriate nonobligatory turns spontaneously, following natural cues, during the instructional session.
- Compare the individual's performance during this instructional session to his/her performance in previous instructional sessions.
- Remember that you may see some variability in performance depending on factors such as the individual's health, attention, or mood on any given day. However, in general terms, you should expect to see increases in the percentage of opportunities where the individual spontaneously takes appropriate nonobligatory turns at the natural cue level.
- If the individual's frequency of turn taking is increasing with instruction, then continue to practice until the individual is proficient.
- If the individual's frequency of turn taking is not improving as expected, despite repeated instructional sessions, then you may need to brainstorm to identify the problem and then modify the instruction to ensure it is effective.
- Check with the individual who uses AAC and/or the significant others in his/her life periodically and assess their satisfaction with the instructional program as it progresses.

Practice Until Proficient

- Continue practicing until the individual who uses AAC is proficient at taking nonobligatory turns.

- When the individual takes appropriate nonobligatory turns spontaneously at or above criterion level (for example, in at least 80% of the opportunities at the natural cue level in at least 3-4 different situations) during two consecutive instructional sessions, then go to **Step 4 - Observe in the natural environment in practiced situations.**

- If the individual has not yet met criterion (for example, takes appropriate nonobligatory turns in less than 80% of the opportunities at the natural cue level), then continue instruction until the criterion is met.

SUMMARY OF CUING PROCEDURES
Turn Taking

- Level 1: Provide **natural cues.**
  - If the individual spontaneously takes an appropriate nonobligatory turn after the natural cue, respond appropriately, and circle "Nat cue" on the data sheet. Begin another trial with *different* natural cues, using either the same situation or a new situation.
  - If incorrect or incomplete, provide brief feedback (for example, "No, try this message") and go directly to level 4, **model**.
  - If individual says nothing, go to level 2, **expectant delay**. Do not say anything.

- Level 2: Use an **expectant delay.**
  - If the individual takes an appropriate nonobligatory turn after the expectant delay, respond appropriately, and circle "Exp Delay" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If incorrect or incomplete, provide brief feedback (for example, "Use this message") and go directly to level 4, **model**.
  - If individual says nothing, go to level 3, **point**. Do not say anything.

- Level 3: **Point** toward the individual or his/her AAC system(s).
  - If the individual takes an appropriate nonobligatory turn following the pointing cue, respond appropriately, and circle "Point" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If incorrect or incomplete, provide brief feedback (for example, "Use this message") and go to level 4, **model**.
  - If individual says nothing, go to level 4, **model**. Do not say anything.

- Level 4: **Model** the correct use of an appropriate nonobligatory turn.
  - If the individual takes an appropriate nonobligatory turn after the model, respond appropriately, and circle "Model" on the data sheet. Begin another trial with the *same* natural cues using the *same* situation.
  - If individual says nothing or if incorrect or incomplete, **model** again and use a brief verbal cue (for example, "Now you try."). Use physical guidance if necessary.

INSTRUCTION
Turn Taking

Individual who uses AAC: ______________________
Instructor: ______________________

- Use the "Summary of Cuing Procedures" to remind you when to use which cues.
- Fill in the date, situation, and partner for each trial.
- Record the individual's performance on a new line each time he/she has the opportunity to take a nonobligatory turn.
- Circle the highest cuing level used (**natural cue, expectant delay, point, model**).
- Remember that the AAC user should take a nonobligatory turn **every time** the partner makes a comment.
- Circle "Nat cue" if the individual takes a nonobligatory turn spontaneously following natural cues; circle Exp delay, Point, or Model if the individual requires these prompts.
- Record observations that are of interest under the comment section.
- When the individual takes nonobligatory turns spontaneously (following a natural cue) at criterion level, in at least 3-4 different situations, go to **Step 4: Observe in the natural environment in *practiced* situations.**

Date	Situation	Circle the highest cuing level				Comments
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________
_____	_________	Nat cue	Exp delay	Point	Model	______________

STEP 4 - OBSERVE IN THE NATURAL ENVIRONMENT IN *PRACTICED* SITUATIONS

Check to ensure that learning has generalized to real situations which the individual has practiced successfully in instructional sessions.

- Remind the individual of the situations where he/she would benefit from taking nonobligatory turns.
- Emphasize the importance of taking turns and participating actively in conversations.
- Observe the individual in the natural environment in an actual situation he/she has been practicing in instructional sessions. Join the individual in the setting and observe what happens. Remember, **do not cue** the individual; just watch what happens.
- Check for:
  - Spontaneous use (did the individual take appropriate nonobligatory turns spontaneously, without prompting?);
  - Effectiveness (was the interaction successful?).
- Use the Natural Environment Check data sheet to record the individual's performance.
- Give the individual feedback on his/her performance.
- If the individual **spontaneously takes appropriate nonobligatory turns and is effective**:
  - Observe the individual in other situations previously practiced during instruction.
  - After the individual completes at least 2-3 practiced situations successfully, go to **Step 5 - Observe in the Natural Environment in New Situations.**
- If the individual **does not take appropriate nonobligatory turns spontaneously** in these situations:
  - Try to determine where and why the individual experienced difficulty. For example, the partner may have used natural cues not practiced during instruction.
  - Return to **Step 3 - Teach Turn Taking,** and change the instruction to address the difficulties the individual had in the natural environment. For example, if the partner used natural cues not practiced in instructional sessions, use more varied natural cues in role plays, including the ones used by the partner in the natural environment. Or provide additional instruction in actual situations in the natural environment.
  - In some situations, you may need to provide instruction for the partner to ensure the success of the interaction. For example, some partners may not expect the individual using AAC to participate.

- If the individual **takes nonobligatory turns spontaneously, but is not effective**:
  - Try to determine why the turns were not effective. For example, the partner may not have understood the message, or it may have taken too long to produce the message.
  - If the messages or modes of communication require modification, make changes that will improve the effectiveness for this type of situation. Follow the guidelines in **Step 2 - Select Vocabulary**.
  - Observe the individual again in the natural environment in practiced situations to see if the changes you have made are effective.

NATURAL ENVIRONMENT CHECK
Turn Taking

Individual using AAC: _____
Instructor: _____

- Observe the individual who uses AAC in situations in the natural environment that he/she practiced during instruction. If the individual is successful, then observe in new situations also.
- For each observation, record the date and situation. Indicate whether each situation is a "practiced" situation or a "new" situation.
- Record the individual's performance by circling the correct option (Y or N). Circle **Y** (yes) if the individual takes a nonobligatory turn spontaneously when he/she has the opportunity to do so and **N** (no) if he/she does not. Remember to record **each** time the individual has an opportunity to take a nonobligatory turn.
- Use the comment section to record any specific comments of interest (e.g., the message, the partner's reaction). Indicate if the individual's turn was effective or not, that is, did the partner understand and respond appropriately?

Date	Situation	Circle	Comments
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____
_____	_____	Y N	_____

STEP 5 - OBSERVE IN THE NATURAL ENVIRONMENT IN *NEW* SITUATIONS

Check to ensure that learning has generalized to real situations which the individual has **not** practiced previously during instruction.

- Once the individual is successful in the natural environment in at least 2-3 situations previously practiced during instruction, then observe the individual in situations that have **not** been practiced during instruction.

- Remind the individual of all the situations in which he/she should participate actively and take nonobligatory turns.

- Emphasize the importance of taking turns.

- Join the individual in the setting and observe what he/she does. Do not cue the individual; just watch what happens. Observe at least 2-3 new situations.

- Record the individual's performance on the "Natural Environment Check" data sheet. Check for:
  - Spontaneous use (did the individual take appropriate nonobligatory turns spontaneously, without prompting?);
  - Effectiveness (were the turns successful?).

- Give the individual feedback on his/her performance.

- If the individual **takes appropriate nonobligatory turns spontaneously and is effective** in these situations:
  - Celebrate the individual's success learning to take nonobligatory turns! Discuss the impact of taking turns in social interactions.
  - Please remember to complete **Step 6 - Evaluate Outcomes** and **Step 7 - Complete Maintenance Checks**.

- If the individual **does not take nonobligatory turns spontaneously** in these situations:
  - Try to determine where and why the individual experienced difficulty. For example, the partner may have used natural cues not practiced during instruction, or the individual may have had trouble generalizing the use of nonobligatory turns to new situations without first practicing them in instructional sessions.
  - Return to **Step 3 - Teach Turn Taking,** and change the instruction to address the difficulties the individual had in the natural environment. For example, if the partner used natural cues not practiced during instruction, use more varied natural cues in role plays, including the ones used by the partner in the natural environment. If the individual using AAC seemed to have trouble generalizing the use of appropriate nonobligatory turns to unpracticed situations, then practice a wider variety of situations where the individual interacts with different people

socially or practice turn taking in real situations in the natural environment.
- In some situations, you may need to provide some instruction for the partner to ensure the success of the interaction. For example, some partners may not expect the individual to take turns in social interactions and may provide few opportunities to do so.

- If the individual **takes appropriate nonobligatory turns, but is not effective**:
  - Try to determine why the turns were not effective.
  - If the messages themselves or the modes of communication are ineffective, make changes to improve the effectiveness. Follow the guidelines in **Step 2 - Select Vocabulary**.
  - Observe the individual again in the natural environment in new situations to see if the changes you have made are effective. If the changes are effective, then you are finished with instruction. Celebrate the individual's success learning to take nonobligatory turns! Be sure to complete **Step 6 - Evaluate Outcomes** and **Step 7 - Complete Maintenance Checks.**

STEP 6 - EVALUATE OUTCOMES

As you complete instruction, be sure to get feedback from the individual who uses AAC and the significant others in his/her life to evaluate the outcomes of the instruction and ensure satisfaction with the program. Evaluation is a critical component to any instructional program. It determines the extent to which desired outcomes have been attained, as well as if there are any unexpected outcomes, either positive or negative.

- Ask for feedback on the outcomes of the instruction from the individual who uses AAC and the significant others in his/her life (for example, parent, teacher, residential counselor, spouse).

- Solicit feedback through questionnaires or rating scales or through more informal discussions. Ask the individual who uses AAC to complete the Consumer Feedback form, if appropriate. Ask the significant others to complete the Partner Feedback form, if appropriate. These forms provide examples of questionnaires that can be used to solicit feedback. You may prefer to develop your own feedback forms or to modify these forms. For example, you may need to modify the wording of questions so that they are understood easily by the individual who uses AAC.

- Summarize the feedback, noting the strengths of the program and suggestions for improvement.

- Meet with everyone involved to discuss any problems and to develop specific action plans to address these problems. Identify the action that needs to be taken, the individual responsible, and the time line for completion. Make sure that the action plans are implemented and the outcomes are satisfactory.

- Use the feedback as a guide to improve instruction and to plan future intervention with the individual who uses AAC and his/her significant others.

- Remember to complete **Step 7 - Complete Maintenance Checks** to ensure that the individual continues to take nonobligatory turns spontaneously when interacting socially in the natural environment, even though formal instruction in this skill has ended.

CONSUMER FEEDBACK
Turn Taking

Individual who uses AAC: _____

Date: _____

We are very interested in your feedback about the instruction you received to increase your turn taking. Please answer the following questions. Add any additional comments in the space provided. Thank you.

1. Did the instruction help you to become a more effective communicator?
   _____yes _____no
   If yes, how?_____
   _____
   _____

   If no, why not?_____
   _____
   _____

2. What did you like **most** about the instruction?
   _____
   _____
   _____

3. What did you like **least** about the instruction?
   _____
   _____
   _____

4. Would you recommend that others participate in this instructional program?
   _____yes_____no
   If not, why not?_____
   _____
   _____

5. Do you have any other comments or suggestions about this instructional program?
   _____
   _____
   _____

PARTNER FEEDBACK
Turn Taking

Individual who uses AAC: _____
Person completing this form: _____
Date: _____

As you know, _____ participated recently in an instructional program to teach increased turn taking. We are very interested in your feedback about this program. Please answer the following questions. Add any additional comments in the space provided. Thank you.

1. Did the instruction help _____ to become a more effective communicator?
_____yes_____no

   If yes, how?_____
   _____
   _____

   If no, why not?_____
   _____
   _____

2. Would you recommend that others participate in this instructional program?
_____yes_____no

   If not, why not?_____
   _____
   _____

3. Do you have any other comments or suggestions about the program?
   _____
   _____
   _____
   _____

Thank you!

STEP 7 - COMPLETE MAINTENANCE CHECKS

After instruction is finished, complete periodic checks in the natural environment to ensure that the individual continues to take appropriate nonobligatory turns when interacting with people socially even though instruction has been completed.

- Two weeks after completing instruction, observe the individual interacting in several social situations in the natural environment. If the individual does not take appropriate nonobligatory turns spontaneously (following natural cues) at criterion level, return to **Step 3 - Teach Turn Taking.**

- If the individual is successful, continue to observe the individual interacting with others socially at monthly intervals until you are sure that the individual will continue to take nonobligatory turns spontaneously when he/she has the opportunity.

- Remind the individual of the importance of taking nonobligatory turns.

- Give the individual feedback on his/her performance. Celebrate the individual's continued success taking nonobligatory turns in social conversations.

SUMMARY OF THE INSTRUCTIONAL STEPS AND PROCEDURES

Turn Taking

Step 1 Complete Baseline

- Select situations where the individual would benefit from participating more actively and taking nonobligatory turns.
- Observe the individual in 3-4 situations and collect baseline data.
- Review the baseline data and decide if intervention is warranted.
- Obtain the commitment of the individual who uses AAC and of the significant others. Give your commitment to teach turn taking.

Step 2 Select Vocabulary for Turn Taking

- Determine the vocabulary required to allow the individual to take nonobligatory turns.
- Determine the most appropriate wording for the message(s).
- Decide what means the individual will use to communicate each turn.

Step 3 Teach Turn Taking

- Specify the goal of instruction.
- Explain the importance of this goal.
- Demonstrate how to take nonobligatory turns.
- Set up situations to teach turn taking in the natural environment. Use role plays to provide additional practice, if appropriate.
- Provide guided practice in taking nonobligatory turns. Always start with a natural cue. Provide additional cues, that is, expectant delay, point, and/or model only as required (see the Summary of Cuing Procedures).
- Record the individual's performance on the Instructional Data Sheet.
- Provide feedback to the individual on his/her progress.
- Evaluate the individual's progress. Adapt the instruction if required.
- Practice until the individual is proficient.

Step 4 Observe in the Natural Environment in *Practiced* Situations

- Observe the individual, in the natural environment, in situations that were practiced previously during instruction.
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of nonobligatory turns and the effectiveness of these turns.
- If the individual does not use nonobligatory turns spontaneously or is not effective, then adapt the message and/or the instruction as required.
- When the individual is successful in these situations, move on to Step 5 and observe the individual in the natural environment in new situations, not previously practiced during instruction.

Step 5 Observe in the Natural Environment in *New* Situations

- Observe the individual, in the natural environment, in situations that were not previously practiced during instruction.
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of nonobligatory turns and the effectiveness of the turns.
- If the individual does not use nonobligatory turns spontaneously or is not effective, then adapt the message and/or the instruction as required.
- When the individual is successful in these new situations, celebrate the individual's success!

Step 6 Evaluate Outcomes

- Ask for feedback from the individual who uses AAC and the significant others on the instructional program.
- Develop specific action plans to address any problems reported.
- Use the feedback as a guide to improve instruction and to plan future intervention with the individual and the significant others.

Step 7 Complete Maintenance Checks

- Observe the individual, in the natural environment, at regular intervals after instruction is completed (2 weeks, 1 month, 2 months after instruction).
- Collect data on the individual's performance using the Natural Environment Check data sheets. Record spontaneous use of nonobligatory turns and the effectiveness of the turns.
- If the individual does not use nonobligatory turns spontaneously or is not effective, then adapt the message and/or provide some more instruction as a refresher, as required.
- When the individual is successful in these situations, celebrate the individual's continued success using nonobligatory turns!

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